ERID-239557

LA-UR-13-22841
April 2013
EP2013-0037

Background Metals Concentrations and Radioactivity in Storm Water on the Pajarito Plateau, Northern New Mexico

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1.0 INTRODUCTION

This report presents the results of an investigation conducted by Los Alamos National Laboratory (the Laboratory) to understand the chemical composition of storm water runoff in developed and undeveloped areas in the Laboratory and the Los Alamos County townsite. The principal objectives of the study were to (1) determine background concentrations in reference watersheds and western boundary locations and baseline concentrations in urban runoff for metals and radioactivity, and (2) determine the baseline concentrations of metals and radioactivity in urban runoff from the Los Alamos County townsite and developed landscapes within the Laboratory. Runoff from legacy contamination at Laboratory and surrounding sites was not considered in this study.

The Laboratory is located in an approximately 36 mi^2 portion of the Pajarito Plateau drained by a large number of canyons and streams. The Pajarito Plateau is an approximately 10-mi-wide transition area between the steep, high-altitude slopes of the Jemez Mountains and the Rio Grande. Surface water is carried downstream to the Rio Grande through relatively small channels situated in the bottom of canyons that have cut into the plateau surface (erodible Bandelier Tuff). A few canyons contain relatively short segments of "perennial" streams that flow year round because of spring sources, snowmelt, and rainfall, largely from watersheds extending into the mountains. However, most of the canyons originating on the plateau have ephemeral streams with flow limited to periods of short duration in response to intense thunderstorm rainfall events and snowmelt close to the mountain front. Because of the intensity of these events and the partial vegetative cover, the storm water runoff can carry substantial amounts of sediment. Any landscape-associated constituents, such as metals, are also present in sediment entrained in the runoff.

The quality of storm water runoff from most Laboratory facilities is rigorously monitored through several programs. However, without knowledge of baseline concentrations, it is difficult to distinguish certain constituent levels resulting from current or historical Laboratory operations from those naturally related to the landscape itself. Previous investigations established baseline elemental concentrations for inorganic chemicals and radionuclides in sediment by focusing on prehistoric channels and floodplains (McDonald et al. 2003, 076084). However, quantitative characterization of baseline concentrations for metals and radioactivity in surface waters have not been conducted. In addition, there is uncertainty as to the quality of urban runoff from the Los Alamos County townsite and developed landscapes within the Laboratory.

This study was initiated in 2009 to measure background levels of metals and radioactivity in storm waters of the Pajarito Plateau unaffected by Laboratory activities and baseline levels of metals and radioactivity in storm water running off developed urban landscapes containing buildings, roads, parking lots, and associated infrastructure. Sampling locations distant from developed landscapes and Laboratory activities were selected to avoid any known contamination and to provide reasonable estimates of baseline concentrations, including a wide variety of bedrock source areas and sediment texture. Urban sampling locations were selected to avoid any Laboratory legacy contamination but to be representative of a developed environment and contaminants associated with structures and activities within that environment. Water-quality conditions measured at background sites and at urban locations reflect the constituent levels in storm water runoff derived from the landscape.

Automated samplers were deployed in small stream channels to collect the first pulse of runoff to follow thunderstorms. A data set of metals concentrations and radioactivity in water samples was compiled to assess background levels at locations above Laboratory operations and baseline urban levels at locations around the Los Alamos County townsite and developed landscapes within the Laboratory. Estimates of the upper limit of background or baseline conditions, intended for use in determining if runoff is potentially contaminated, were calculated based on upper tolerance limits (UTLs) referred to as "background values" (BVs) in the report.

The storm water program expects to collect additional urban storm water runoff samples during the 2013 monitoring season to improve the confidence of the UTL values. Additional results will be added to the respective groups and UTLs will be recalculated. Statistical results will be evaluated and reported as a revision to this document.

1.1 Site Description

The Laboratory is located on the Pajarito Plateau in Los Alamos County in north-central New Mexico, approximately 60 mi north-northeast of Albuquerque and 25 mi northwest of Santa Fe (Figure 1). The lands surrounding the Laboratory are held by the Santa Fe National Forest, the U.S. Bureau of Land Management, Bandelier National Monument, the U.S. General Services Administration, and Los Alamos County. The Pueblo de San Ildefonso borders the Laboratory to the east.

The Laboratory lies in the upper Rio Grande watershed denoted by U.S. Geological Survey hydrologic unit codes 13020101 and 13010005 (http://water.usgs.gov/wsc/reg/13.html). The upper Rio Grande is a large watershed (approximately 7500 mi^2) that generally flows from north to south. A variety of land uses exist within the watershed, including range lands, agriculture, light industry, and urban development.

The Pajarito Plateau is located on the eastern flanks of the Jemez Mountains on fingerlike mesas capped mostly by the Bandelier Tuff. Bedrock sources on the Pajarito Plateau close to the mountain front include Bandelier Tuff and dacitic rocks of the Tschicoma Formation (Smith et al. 1970, 009752). Bedrock sources are dominated by Bandelier Tuff away from the mountain front. Generally, cobbles and gravel consisting of dacite tuff and pumice in a sandy matrix rich in quartz and sanidine crystals dominate the lithology of canyon bottoms. Mesa tops are dominated by weathered Bandelier Tuff with soils derived from aeolian deposition. Urban and Laboratory landscapes include parking lots, roads, and structures ranging in age from the 1940s to 2012. These features release a variety of soluble and insoluble constituents to storm water, including metals and organic compounds.

2.0 MONITORING DESIGN

Urban and background locations were chosen based on historical data analysis to ensure they were removed from potentially contaminated areas (LANL 2009, 106090). Locations were also selected based on their spatial relationship to drainages from Laboratory and developed areas within Los Alamos County.

2.1 Background Storm Water Monitoring Locations

Background storm water samples were collected from two primary groups of locations: tributaries that enter the Laboratory's western (upstream) boundary and tributaries in a remote area north of the community of Los Alamos (Figure 2).

Four Western Boundary stations were located in tributaries flowing from the eastern edge of the Jemez Mountains, where the topography flattens with the Pajarito Plateau. Western Boundary stations were located in the tributaries known as upper Water Canyon (E252), upper Cañon de Valle (E253), upper Pajarito Canyon (E240), and upper Los Alamos Canyon (E025), as shown in Figure 2. Storm water monitored at the Western Boundary stations is generated from the slopes of the Jemez Mountains. Upper Water Canyon is designated as a perennial stream (20 New Mexico Administrative Code [NMAC] 6.4.126), while the other three streams are designated as ephemeral or intermittent (20 NMAC 6.4.128). Although the mountain front was substantially burned by the Cerro Grande wildfire in 2000, ground cover has reestablished with grasses and brushes. The 2011 Las Conchas fire severely burned portions of Water Canyon, Cañon de Valle, and Pajarito Canyon; however, monitoring for background in those watersheds ceased in 2010.

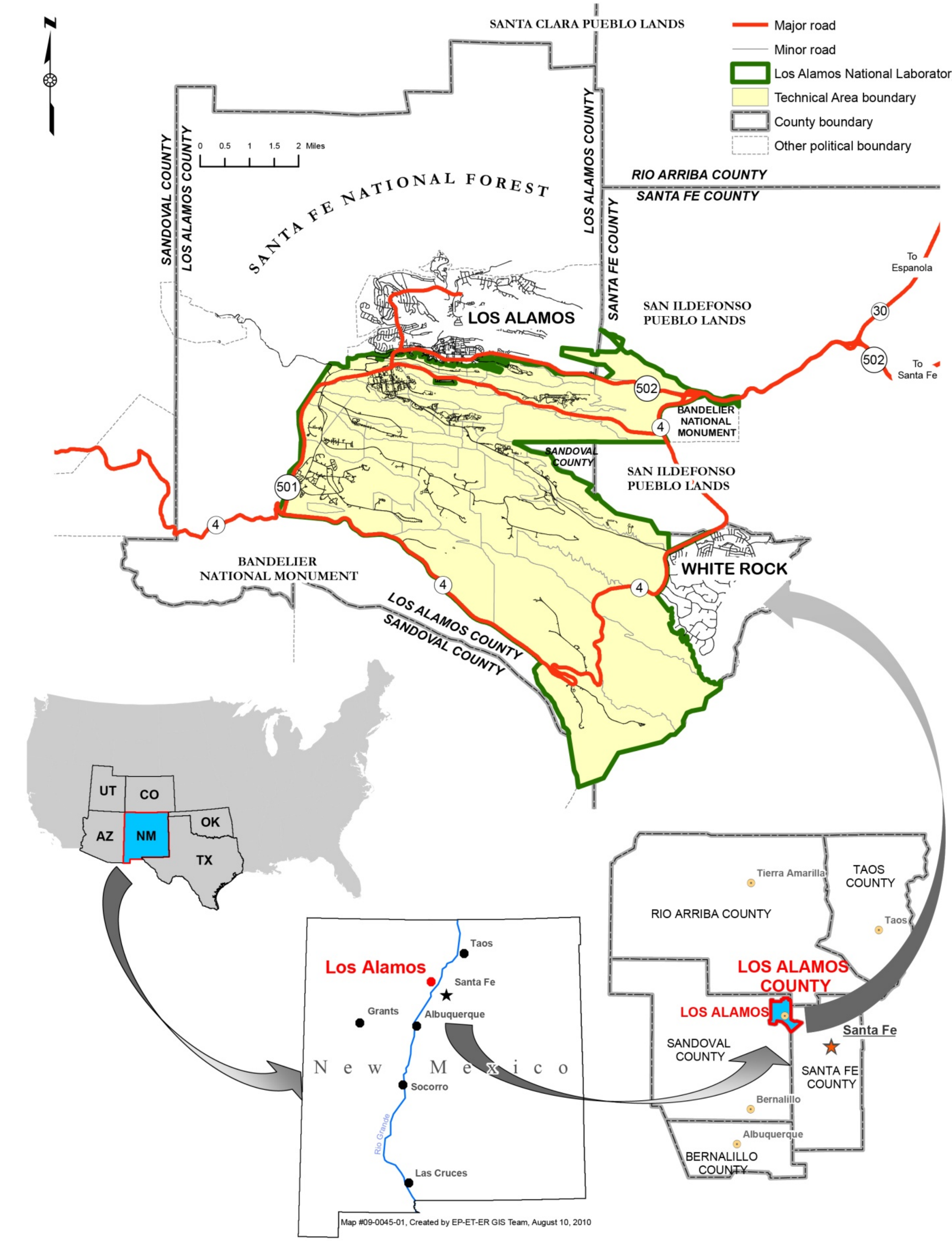


Figure 1 Regional view of study area

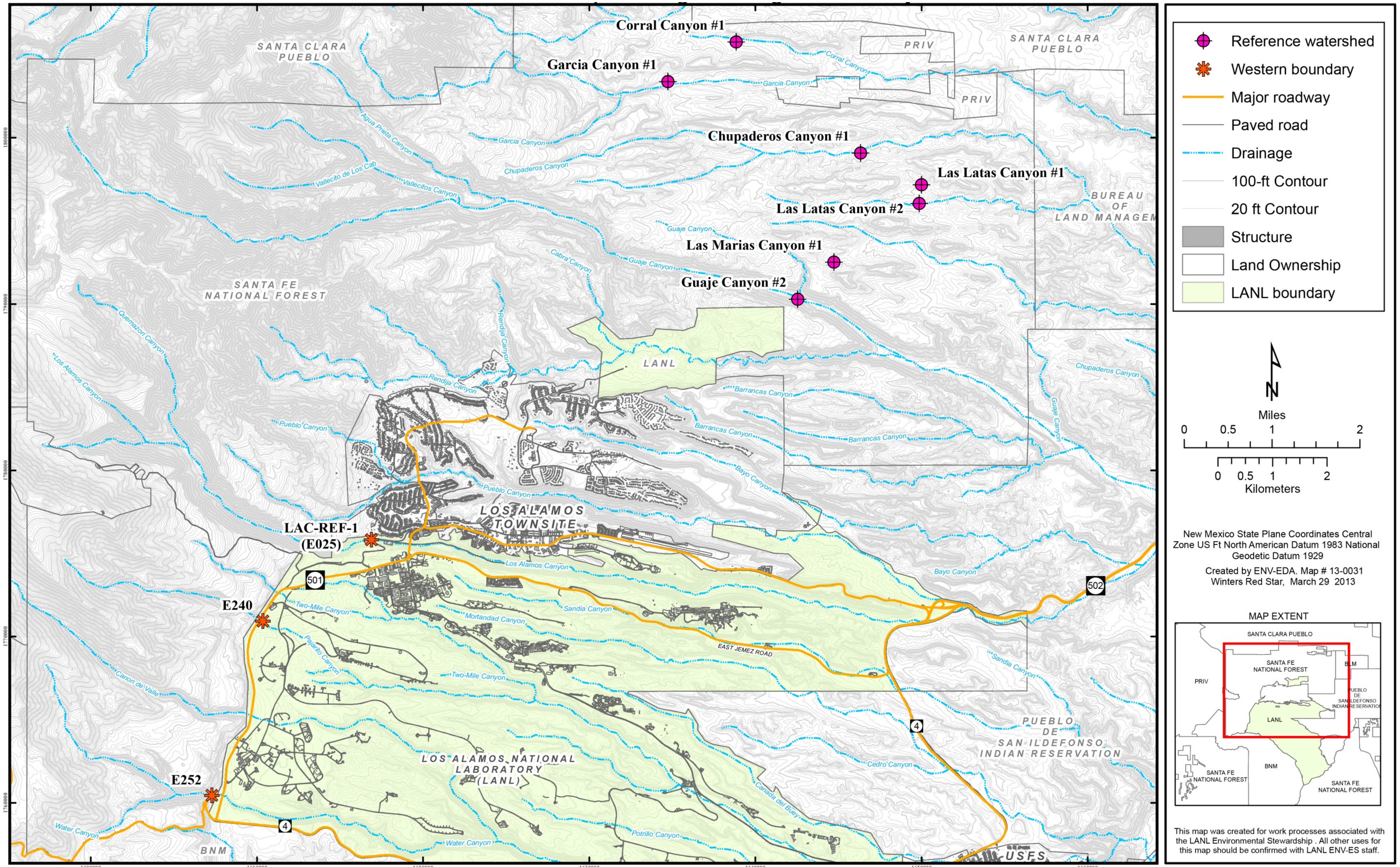


Figure 2 **Storm water runoff from watersheds in undeveloped background regions on the Pajarito Plateau**

The northernmost tributary sampling stations, collectively referred to as the Reference Area sites, were situated in the middle portion of the Pajarito Plateau, several miles away from the mountain front. Reference Area sites were located in middle Guaje Canyon, upper Cañada de Las Marias, upper Cañada de Las Latas, upper Chupaderos Canyon, upper Garcia Canyon, and upper Corral Canyon (Figure 2). Storm water runoff monitored at the Reference Area sites is mostly generated as discharge or flow in response to local storms affecting the northern portion of the Pajarito Plateau. No liquid industrial discharges were released above any of the sampling stations, and most of the contributing watersheds were within the Santa Fe National Forest or on San Ildefonso Pueblo lands with little to no development besides fences and dirt roads. The watershed above the reference monitoring locations was severely burned in the 2011 Las Conchas fire; however, monitoring at these locations was conducted before 2011.

2.2 Urban Runoff Baseline Monitoring Locations

The basic footprint of the developed portions of the Los Alamos townsite has changed little over decades. Retail stores, county government operations, and businesses are concentrated in the downtown area that is situated on a mesa top within a zone roughly 2 to 3 mi across. Away from the commercial center, land use transitions to a residential mix of apartment complexes and single-family houses. The townsite has been laid out in this general configuration since the 1960s. A portion of this development was built on ground that once housed research activities of the Manhattan Project. Buildings from that earlier era were removed, and several rounds of sampling and remediation of the surface have been performed; remaining areas of interest and solid waste management units (SWMUs) and areas of concern (AOCs) have been delineated and the Laboratory is investigating them. Most of the townsite area has long been covered with imported fill dirt, buildings, pavement or park land, in essence forming caps over the original ground.

The footprint of developed facilities at the Laboratory consists of office buildings, research facilities, roads, parking lots, and infrastructure consistent with urban development. Monitoring locations were situated upstream of contaminated areas and adjacent to the upper boundary of site monitoring areas (SMAs) to capture storm water chemistry before it runs onto the SMA. Constituents in run-on storm water can then be compared with what runs off of an SMA to determine the origin of contamination.

Storm water samples were collected in the vicinity of the townsite and Laboratory property to measure metals concentrations and radioactivity in locations representing storm water runoff from urban environments on the Pajarito Plateau. Samplers were placed in ephemeral tributary channels around the edge of the urban development; no urban runoff samplers were placed below any known areas of concentrated contamination. The majority of samplers were located to collect storm water runoff samples from housing developments, schools, and a golf course. In addition to monitoring the townsite perimeter, sampling was also conducted in drainage channels downstream from the Laboratory administrative offices. The monitoring locations are shown in Figure 3.

3.0 METHODS

3.1 Sampling Methodology

Storm water samples were collected using automated samplers and manual grab samples. When and where possible, manual grab samples were preferred because the sample collection time, presence of flow, and visual indicators could be recorded. The vast majority of stream channels within the study area were remote ephemeral drainages that flowed only in response to snowmelt or rainfall events. Consequently, unattended sampling approaches were utilized to collect samples, given the vagaries of weather forecasting and remote locations across the landscape.

Automated samplers included Teledyne ISCO, Inc. (model 3700, 6712, or GLS), and suitcase automated samplers (Global Water WS-700 or WS-750). Automated samplers were set to begin collecting samples immediately after water reached a prescribed water level or "stage" indicated by the respective sensors to collect a single grab sample within the first 30 min of runoff (EPA 1992, 213443). Teflon sample suction lines, used to collect water samples, were located above the stream bottom to minimize the collection of bedload sediment and to provide consistency in suspended sediment measurements. ISCO samplers contained 12 or 24 1-L bottles. High-density polyethylene bottles were used for suspended sediment concentration (SSC), particle size, total organic carbon (TOC), radioactivity, and metals analyses. These bottles filled sequentially and continuously until all bottles were filled unless water levels were insufficient.

Global Water samples were equipped with a 1-gal. glass and a 1-gal. polyethylene bottle that collected simultaneously from two separate inlet tubes, until the bottles were full or unless water levels were insufficient. Water collected from Global Water samplers was decanted from the bottles into 1-L glass or high-density polyethylene bottles depending on the analysis, with the exception of particle-size analysis samples, which were sent for analysis in either a 1-gal. glass container or decanted into a 1-L polyethylene bottle.

3.2 Analytical Methods

Analytical results presented in this section were determined using the following methods:

Analyte(s)	Method
SSC (nonfiltered)	EPA160.2 or ASTM D3977-97
Laser particle-size analysis (nonfiltered)	ASTM C1070-01
TOC (nonfiltered)	EPA SW-846-9060
Target analyte list (TAL) metals (filtered and nonfiltered)	EAP 200.7, EPA 200.8, and EPA 245.2
Anions	EPA 300.0
Radioactivity (gross alpha and Radium-226 + -228; nonfiltered)	EPA 900, EPA 903.1, EPA 904,

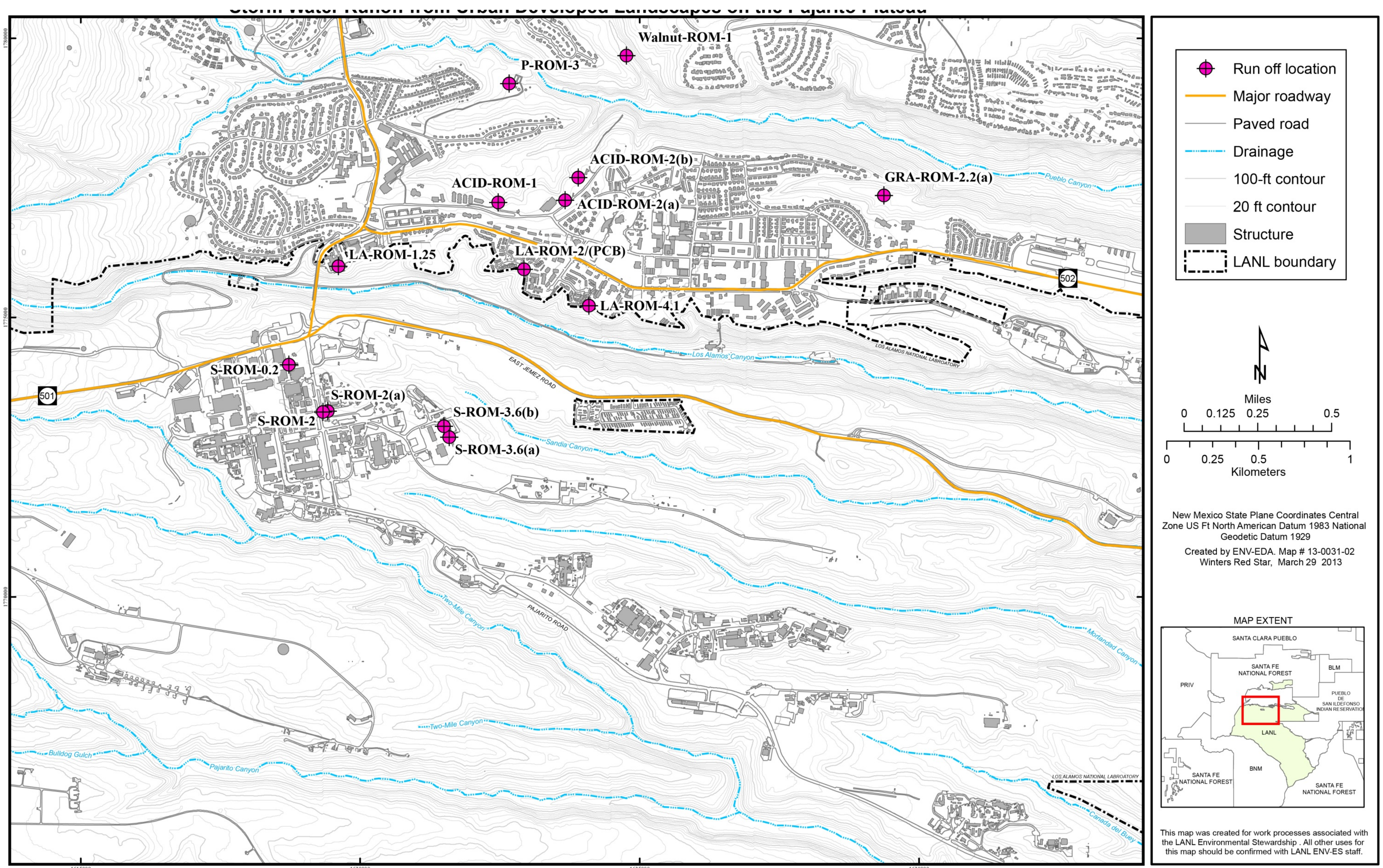


Figure 3 Storm water from urban developed landscapes on the Pajarito Plateau

3.3 Quality Assurance/Quality Control

3.3.1 Field Quality Control

To test for residual contamination from previous sample collection, selected auto samplers were activated to collect high-purity high-performance liquid chromatography (HPLC) water purchased from a commercial chemical supply. Although sufficient sample volumes were often difficult to collect, four duplicate samples were analyzed when sufficient volume was present. Quality control (QC) samples were sent to contract laboratories for analysis. Three sampler equipment rinsate blanks were collected in the field from automated samplers using HPLC water pumped through the intake tubing and related equipment normally used for sample collection. Results from the equipment rinsate blank samples were generally low. Residual concentrations may have resulted from the use of different numbers of purge cycles programmed to rinse the sample tubing between aliquots, different amounts of residual sediment and corresponding chemical load, immediate environmental influences in the field, or the sample splitting process.

Three storm water duplicate samples were collected from the Global Water automatic samplers. Each duplicate sample was prepared by shaking the container and decanting an aliquot into a 1-L bottle. In addition, each duplicate sample was prepared from a different container than the original sample, resulting in some sediment settling that may not have been resuspended adequately when the containers were shaken.

3.3.2 Analytical Laboratory QC

All analytical laboratory results underwent validation by the EIM (Environmental Information Management) database that feeds information to Intellus automatic validation algorithm. Older data (pre–March 2012) were validated by Analytical Quality Associates, Inc. (AQA), an independent U.S. Department of Energy (DOE) contractor, in Albuquerque, New Mexico, following the guidelines in the DOE National Nuclear Security Administration Model Data Validation Procedure (DOE 2006, 213441) and U.S. Environmental Protection Agency (EPA) Contract Laboratory Program National Functional Guidelines for Data Review (EPA 2004, 213445; EPA 2004, 213446; EPA 2008, 213449).

3.4 Statistical Methods and Approach

Statistical analysis of data sets consisted of the following three steps:

(1) Prepare data for analysis

(2) Evaluate data heterogeneity:

- Determine representativeness of data sets
- Identify and eliminate suspect values from data sets

(3) Calculate baseline levels of constituents in storm runoff

3.4.1 Prepare Data for Analysis

All statistical analyses were performed on validated data. Estimated concentrations, “J” qualified, and nonqualified results were used in the calculations. Data qualified with “U, UJ, or R” were not used in the statistical analysis. Data were analyzed using Statistica 8.0 (StatSoft, Tulsa, Oklahoma) and ProUCL 4.1 (http://www.epa.gov/nerlesd1/databases/datahome.htm). Statistical results were considered significant at $p < 0.05$.

3.4.2 Evaluate Data Heterogeneity

When data were determined to be representative for this report, they adequately reflected the natural variability in the hydrologic system and in the inherent geochemical conditions of the watersheds. The representativeness of samples was evaluated by ensuring that samples were collected under a variety of stream flow conditions and across an assortment of landscape surfaces in the contributing drainages.

To determine runoff baseline values, the data sets were first inspected for potential outlying values that were exceptionally high relative to the rest of the data. All the station locations were upstream of Laboratory liquid discharges and SWMUs/AOCs; thus, the potential for contamination present in the baseline samples was minimized by site selection. It was important to ensure the baseline data sets represented "single" populations free of contamination or outliers. For filtered results, both quantitative and graphical lines of evidence were used to help determine if these baseline data represented a single population. Suspect values were identified through a multistep process. If the largest result for a given analyte was anomalous (e.g., more than 5 times larger) compared with the second largest result, it was considered to be suspect. If a group of the largest concentrations on different sampling dates originated from the same location, it was also considered to be suspect. When confirmed through examination of probability plots, the suspect results were removed from the data set (see probability plot descriptions at http://www.itl.nist.gov/div898/handbook/eda/section3/eda33.htm).

The probability plots show each analytical result ordered from lowest to highest (Appendix A). The x-axis is the standard normal quantile scale. The units of the standard normal quantile are in standard deviations, where 1 represents 1 sigma or 1 standard deviation. The y-axis of the probability plot is the concentration of the analyte. The purpose of these plots is twofold. First, they provide a succinct way to present all the data for each analyte. Second, they provide a way to assess the statistical distribution of each analyte. If the data for an analyte follow a straight line when plotted on a standard normal scale, these data are considered to originate from a normal statistical distribution. One can assess the fit to other statistical distributions by transforming the y-axis to another scale. For example, chemical data are frequently derived from a lognormal distribution, and transforming the y-axis into a logarithmic scale assesses the fit to a lognormal distribution. Data that fit the normal distribution are symmetrically centered about the mean. Most environmental data, however, naturally contain an occasional high value, and the upper half of the distribution is stretched, or skewed, in the direction of the high values. Both the lognormal and gamma distributions describe skewed data sets and often best match environmental results. Probability plots determine the high values are not caused by contamination beyond natural levels by determining if the data fit along a straight line after transformation.

For unfiltered sample results, an additional step was performed to confirm the value(s) were suspect. Total concentrations of constituents in surface water may vary dramatically because of the concentrations found in suspended sediment and the amount of suspended sediment entrained in each sample. Thus, suspect water concentrations could be explained by the amount of sediment in the samples. This possibility was accounted for by assessing the concentrations in the sample sediment fraction as well. Total concentrations in suspended sediment were calculated by dividing the total concentration in water by the corresponding SSC and multiplying by a unit conversion factor. For those samples without a SSC measurement, the corresponding total suspended solids (TSS) concentration was used instead. If an anomalous water concentration was verified to also have an enriched concentration in suspended sediment, the result was removed from the baseline data set.

SSCs were calculated using the following formula:

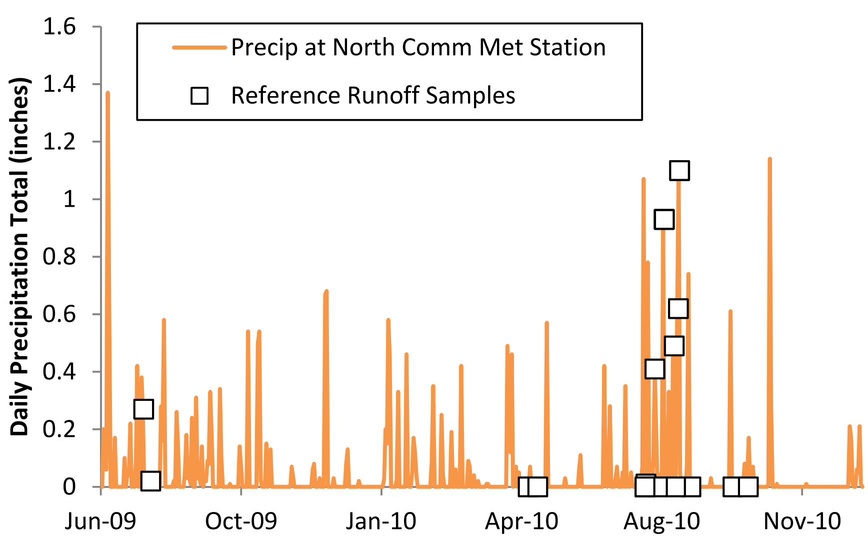
$$Suspended\ constituent\ conc. \left(\frac{\mu g}{g}\right) = \frac{Total\ concentration\ in\ water\ (\frac{\mu g}{L})}{Suspended\ sediment\ concentration\ (\frac{mg}{L})}\ x\ Conversion\ Factor \qquad \textbf{Equation 1}$$

3.4.3 Calculation of Background/Baseline Runoff Values

After all suspect values were removed from the data set, UTLs 95%/95% confidence levels were calculated by ProUCL for the best-fit distribution to calculate the upper limit concentrations for constituents under baseline conditions. In simple terms, the 95%/95% UTL represents a range where 95% of the data falls below that value. This baseline is commonly used to assess environmental data to determine BV and baseline values. Regression order statistics were used to describe nondetection results. The statistical distribution of concentrations was tested to determine if they approximated the normal probability function (or normally distributed after a logarithmic or gamma transformation) with the Lillifors and Kolmogorov-Smirnov methods. The appropriate statistical distribution for each analyte was selected based on the ProUCL distribution fit test results. Following recommendations in the ProUCL software, a minimum of seven detections for a given analyte was needed to calculate meaningful and representative UTL values.

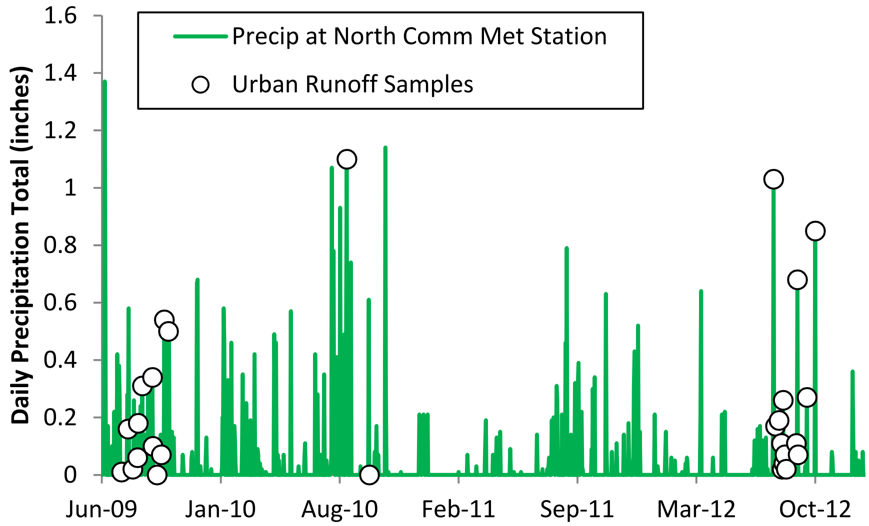
4.0 REPRESENTATIVENESS OF SAMPLES

For a baseline study of surface water quality, it was important to collect a sufficient number of samples to adequately reflect the natural range of typical flow conditions and landscape properties. Because most of the monitoring stations were not gaged, precise stream flow conditions at the time of sampling are not known. However, an approximate proxy to what stream flow might have been of the day of sampling was determined by examining total rainfall amounts at nearby meteorological stations. Figures 4 through 6 compare the dates when samples were collected with the corresponding daily total rainfall amounts measured at the closest meteorological monitoring station. For the Reference and Urban stations, monitoring stations sample collection dates were matched to precipitation amounts recorded at the North Community meteorological station. Sample collection dates at the Western Boundary stations were matched to Technical Area 06 meteorological station rain events.



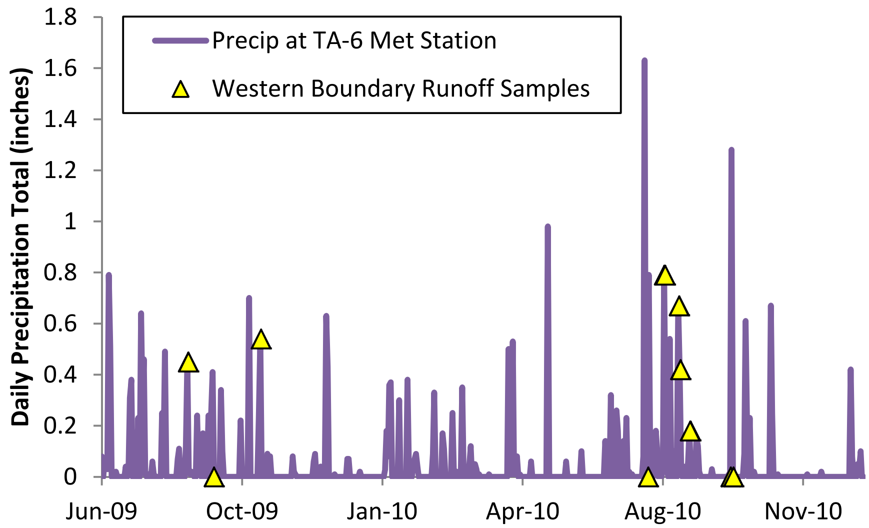
Note: Raw precipitation data accessed at http://environweb.lanl.gov/weathermachine/.

Figure 4 Precipitation amounts measured on dates runoff samples were collected in Reference Area locations



Note: Raw precipitation data accessed at http://environweb.lanl.gov/weathermachine/.

Figure 5 Precipitation amounts measured on dates runoff samples were collected in Urban locations



Note: Raw precipitation data accessed at http://environweb.lanl.gov/weathermachine/.

Figure 6 Precipitation amounts measured on dates runoff samples were collected in Western Boundary locations

The plots indicate the samples were collected during a range of rainfall depths. Daily rainfall amounts ranged from near 0 to over 1 in. at all three sampling areas. For some sample collection events, no rainfall was recorded at the noted meteorological stations, indicating the storms likely were very localized on those days but runoff amounts were sufficient to trigger the automated runoff samplers.

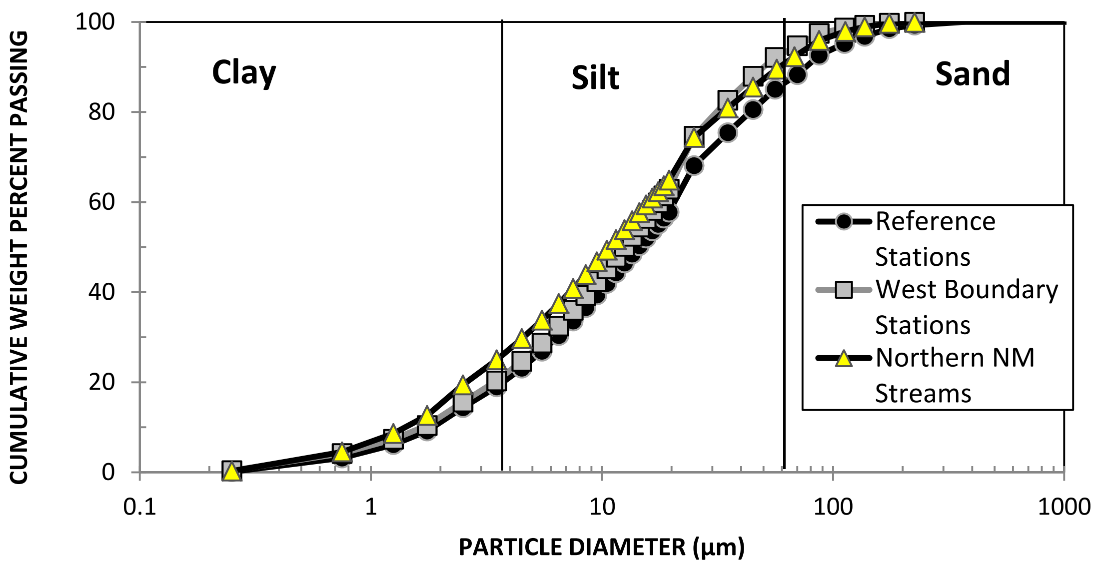
With sampling conducted both along the Western Boundary and in the Reference Area canyons, runoff off from a range of surficial geological materials was captured. Bedrock types found in watersheds for the Western Boundary stations predominantly include dacitic rocks of the Tschicoma Formation (Smith et al. 1970, 009752). Reference Area tributary canyons drain areas exposing the Puye Formation, the Bandelier Tuff, and the Tschicoma Formation (Smith et al. 1970, 009752). Cobbles and gravel largely consisting of dacitic and andesitic clasts in a sandy matrix dominate the lithology of the Guaje Canyon sediment. The other Reference Area tributary canyons drain areas underlain by Bandelier Tuff bedrock.

Overall, the samples collected for this study were found to be representative of typical natural flow conditions and landscape materials found on the Pajarito Plateau.

5.0 STORM WATER MONITORING RESULTS

5.1 Reference Area Background Stations

A total of 19 runoff samples were collected from the Reference Area stations in 2009 and 2010. The results reflect background runoff conditions from landscapes with surficial geological materials derived from Bandelier Tuff, Puye Formation, and the Tschicoma Formation. Figure 7 shows the mean particle-size distribution for the Reference and Western boundary stations, along with the northern New Mexico tributary stations for added reference. On average, the suspended sediment sampled at each of the general sampling areas is remarkably similar in texture. The median (D50) suspended sediment size for all the sampling areas was essentially identical, near 12 µm. However, the quantities of suspended sediment carried by Reference area runoff were significantly larger than those measured at Western stations.



Source: LANL 2012, 219767.

Figure 7 Comparison of mean particle-size distributions for suspended sediment at Reference Area, Western Boundary, and northern New Mexico tributary runoff sampling stations

The median SSC at Reference area stations was 6600 mg/L, compared with 470 mg/L at Western Boundary stations (Figure 8). The relative lack of ground cover within the Reference area contributed to the larger SSC. A suspect SSC of 163,550 mg/L measured at Corral-1 on August 16, 2010, was removed from the data set (second largest value in the data set was 23,940 mg/L; 5 times the next highest value).

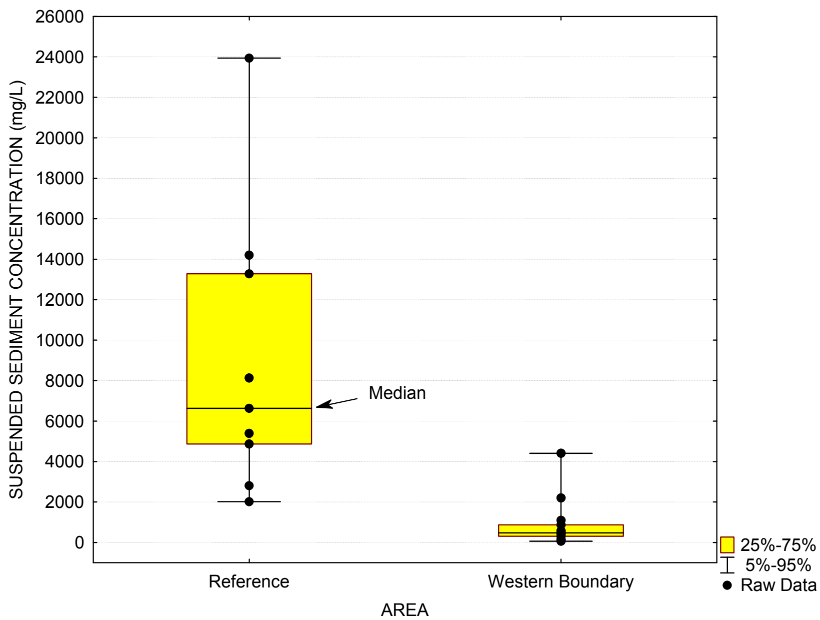


Figure 8 Comparison of SSC at Reference Area and Western Boundary background runoff stations

5.1.1 Summary Statistics of Reference Area Background Storm Water Runoff

A summary of dissolved and total metals concentrations and radioactivity measured in Reference Area background storm water runoff samples is presented in Tables 1 and 2. The tables include all results, except for identified suspect values that were omitted. Suspect values will be discussed in the section to follow. The complete results, including suspect values, are presented in Appendix B.

Table 1
Reference Area Dissolved Concentration Ranges in Background Runoff

Analyte, Dissolved	Number of Detects	Number of Nondetects	% Nondetects	Raw Statistics Using Detected Results				
				Min	Max	Mean	Median	StdDev
Aluminum	19	0	0	79.7	2620	536.7	392	589.6
Antimony	0	19	100	n/a*	n/a	n/a	n/a	n/a
Arsenic	6	13	68	1.5	6.2	2.617	1.85	1.808
Barium	19	0	0	9.7	90.8	39.86	33.5	23.77
Beryllium	5	14	74	0.11	0.95	0.314	0.13	0.362
Boron	7	12	63	16	29.5	21.44	20.1	5.377
Cadmium	1	18	95	0.28	0.28	0.28	0.28	n/a
Calcium (mg/L)	19	0	0	2.95	18.8	10.47	10.2	4.344
Chloride (mg/L)	15	0	0	0.316	3.11	0.964	0.601	0.914
Chromium	0	19	100	n/a	n/a	n/a	n/a	n/a
Cobalt	14	5	26	1.5	7	3.586	3.4	1.626
Copper	15	4	21	0.79	4.1	1.721	1.6	0.81
Dissolved Organic Carbon (mg/L)	2	0	0	26.7	38.5	32.6	32.6	8.344
Hardness (mg/L)	19	0	0	9.6	62.8	35.93	32.2	15.69
Iron	18	0	0	34	1630	349.8	255.5	379.2
Lead	7	11	61	0.52	2.3	1.223	1.1	0.685
Magnesium (mg/L)	19	0	0	0.452	8.94	2.221	1.49	1.995
Manganese	17	2	11	4.8	2630	506.8	394	611.3
Mercury	0	19	100	n/a	n/a	n/a	n/a	n/a
Nickel	18	1	5	0.59	3.4	1.736	1.65	0.727
Selenium	0	19	100	n/a	n/a	n/a	n/a	n/a
Silver	0	19	100	n/a	n/a	n/a	n/a	n/a
Sodium (mg/L)	19	0	0	0.349	7.96	2.964	1.83	2.496
Sulfate (mg/L)	15	0	0	0.509	12.8	2.891	0.918	4.133
Thallium	0	19	100	n/a	n/a	n/a	n/a	n/a
Uranium	13	6	33	0.05	0.71	0.198	0.15	0.171
Vanadium	16	2	11	1.4	5	3.013	2.85	1.197
Zinc	12	6	33	3.9	170	11.9	5.95	13.92

Note: Units are µg/L unless otherwise indicated.
* n/a = Not applicable.

Table 2
Reference Area Total Concentration Ranges in Background Runoff

Analyte, Total	Number of Detects	Number of Nondetects	% Nondetects	Raw Statistics Using Detected Results				
				Min	Max	Mean	Median	StdDev
Aluminum	19	0	0	839	116000	33888	25500	31730
Antimony	1	18	94	0.66	0.66	0.66	0.66	n/a*
Arsenic	16	3	16	1.6	24	7.85	6.2	6.298
Barium	19	0	0	27.1	4830	1413	717	1381
Beryllium	18	1	5	0.4	59.3	15.71	9.85	15.06
Boron	17	2	11	16.5	46.1	31.56	32.1	9.452
Cadmium	15	4	21	1.1	6.7	3.293	3.2	1.879
Calcium (mg/L)	19	0	0	8.66	186	60.79	39.6	52.31
Chromium	15	4	21	2.7	51.2	15.69	10	14.64
Cobalt	16	3	16	1.4	161	51.19	38.25	47.63
Copper	19	0	0	1.2	104	24.81	22.8	22.4
Gross Alpha (pCi/L)	14	0	0	9.93	1090	288.4	193.5	290.4
Iron	19	0	0	59.5	157000	30214	10800	39739
Lead	19	0	0	0.51	393	97.94	85.3	91.52
Magnesium (mg/L)	19	0	0	1.72	43	12.73	10.4	11.11
Manganese	19	0	0	6.5	37900	6620	2740	8880
Mercury	4	15	79	0.09	0.21	0.145	0.14	0.05
Nickel	18	1	5	2.4	120	42.87	32.75	34.68
Radium-226 and 228 (pCi/L)	7	1	13	7.39	37.8	16.63	10.8	11.06
Selenium	6	13	68	1.3	4.8	2.45	1.7	1.51
Silver	6	13	68	0.25	0.77	0.4	0.3	0.2
Sodium (mg/L)	18	1	5	0.95	7.95	4.36	4.15	2.03
Thallium	4	15	79	0.6	2.5	1.575	1.6	0.918
TOC (mg/L)	19	0	0	7.32	56.5	23.84	20	13.61
Uranium	18	1	5	0.24	18.7	4.756	4.35	4.169
Vanadium	18	1	5	6.1	197	70.73	49.4	61.39
Zinc	18	1	5	7.7	1150	240.4	173.5	267.8

Note: Units are µg/L unless otherwise indicated.
* n/a = Not applicable.

5.1.2 Reference Area Storm Water Background Values

This section focuses on those analytes detected in seven or more samples to calculate meaningful and representative UTLs. Analytes that do not have at least seven detections in either filtered or nonfiltered samples are not discussed. The proposed dissolved BVs for the Reference Area are summarized in Table 3, and the proposed total BVs are summarized in Table 4. The calculated suspended constituent concentrations for the Reference Area samples are presented in Table 5.

Table 3
Summary of Dissolved BVs for Reference Area Storm Water Runoff

Analyte	Dissolved Concentrations		
	Sufficient Number of Detects?	Distribution	UTL: 95,95[a] (µg/L)
Aluminum	Yes	Gamma	2210
Antimony	No	—[b]	—
Arsenic	No	—	—
Barium	Yes	Normal	97.5
Beryllium	No	—	—
Boron	Yes	Normal	30
Cadmium	No	—	—
Calcium (mg/L)	Yes	Normal	21
Chloride (mg/L)	Yes	Gamma	4.03
Chromium	No	—	—
Cobalt	Yes	Normal	7.53
Copper	Yes	KM[c]	3.43
Iron	Yes	Gamma	1500
Hardness (mg/L)	Yes	Normal	74
Lead	Yes	Gamma	9.03
Magnesium (mg/L)	Yes	Gamma	7.95
Manganese	Yes	Normal	1050
Mercury	No	—	—
Nickel	Yes	Normal	3.53
Selenium	No	—	—
Silver	No	—	—
Sodium (mg/L)	Yes	Gamma	12.1
Sulfate (mg/L)	Yes	None[d]	12.8
Thallium	No	—	—
Uranium	Yes	KM	0.52
Vanadium	Yes	KM	5.77
Zinc	Yes	None	109

Units are µg/L unless otherwise indicated.

[a] UTL = 95% UTL with 95% coverage. Seven or more detections assumed needed for meaningful evaluation of distribution and calculation of UTLs.

[b] — = Insufficient number of detections to calculate statistical distribution.

[c] KM = Kaplan-Meier method used when data set contained multiple detection limits.

[d] None = No discernible distribution (p=0.05).

Table 4
Summary of Total BVs for Reference Area Storm Water Runoff

Analytes	Total Concentrations		
	Sufficient Number of Detects?	Distribution	UTL: 95,95[a] (µg/L)
Aluminum	Yes	Gamma	161,000
Antimony	No	—[b]	—
Arsenic	Yes	Gamma	46.0
Barium	Yes	Gamma	7680
Beryllium	Yes	Gamma	86.9
Boron	Yes	Normal	56
Cadmium	Yes	KM[c]	7.3
Calcium (mg/L)	Yes	Gamma	254
Chromium	Yes	Gamma	98.2
Cobalt	Yes	Gamma	322
Copper	Yes	Gamma	103
Gross Alpha (pCi/L)	Yes	Gamma	1490
Iron	Yes	Gamma	203,000
Lead	Yes	Nonparametric	393
Magnesium (mg/L)	Yes	Gamma	52.6
Manganese	Yes	Gamma	43,800
Mercury	No	—	—
Nickel	Yes	Gamma	220
Radium-226+228 (pCi/L)	Yes	Normal	52.7
Selenium	No	—	—
Silver	No	—	—
Sodium (mg/L)	Yes	Normal	9.41
Thallium	No	—	—
Uranium	Yes	Gamma	24
Vanadium	Yes	Gamma	379
Zinc	Yes	Gamma	1350

Units are µg/L unless otherwise indicated.

[a] UTL = 95% UTL with 95% coverage. Seven or more detections assumed needed for meaningful evaluation of distribution and calculation of UTLs.

[b] — = Insufficient number of detections to calculate statistical distribution.

[c] KM = Kaplan-Meier method used when data set contained multiple detection limits.

Table 5
Summary of Suspended Sediment BVs (Calculated) for Reference Area Storm Water Runoff

Reference Area	Suspended Concentrations		
	Sufficient Number of Detections?	Distribution	UTL: 95,95[a] (mg/kg)
Aluminum	Yes	Gamma	29,000
Antimony	No	—[b]	—
Arsenic	Yes	Gamma	5.51
Barium	Yes	Gamma	935
Beryllium	Yes	Lognormal	17.3
Boron	Yes	Gamma	23.2
Cadmium	Yes	Gamma	1.55
Calcium	Yes	Nonparametric	50,500
Chromium	Yes	Gamma	17.2
Cobalt	Yes	Gamma	35.2
Copper	Yes	Gamma	21.2
Gross Alpha (pCi/g)	Yes	Gamma	184
Iron	Yes	Gamma	31,700
Lead	Yes	Gamma	67.9
Magnesium	Yes	Gamma	9310
Manganese	Yes	Gamma	4210
Mercury	No	—	—
Nickel	Yes	Lognormal	42.8
Radium-226 and -228 (pCi/g)	Yes	Normal	6.29
Selenium	No	—	—
Silver	No	—	—
Sodium	Yes	Gamma	3520
Thallium	No	—	—
Uranium	Yes	Gamma	3.31
Vanadium	Yes	Gamma	50.5
Zinc	Yes	Gamma	162

Units are µg/L unless otherwise indicated.

[a] UTL = 95% UTL with 95% coverage. Seven or more detections assumed needed for meaningful evaluation of distribution and calculation of UTLs.

[b] — = Insufficient number of detections to calculate statistical distribution.

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Aluminum (Al)

All 19 dissolved Al results were detects, and the concentration range of detects was from 79.7 µg/L to 2620 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 2210 µg/L, which is within the dissolved Al background concentration range.

All 19 total Al results were detects, and the concentration range of detects was from 839 µg/L to 116,000 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 161,000 µg/L, which is 1.4 times the maximum total Al background concentration.

Arsenic (As)

Six of the 19 dissolved As results were detects, which is not a sufficient number of detects to calculate a UTL value.

Sixteen of the 19 total As results were detects, and the concentration range of detects was from 1.6 µg/L to 24 µg/L These data appear to originate from a gamma statistical distribution (the probability plots are presented in Appendix A). The UTL value is 46 µg/L, which is 1.9 times the maximum total As background concentration.

Barium (Ba)

All 19 dissolved Ba results were detects, and the concentration range was from 9.7 µg/L to 90.8 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 97.5 µg/L, which is 1.08 times the maximum dissolved Ba background range.

Nineteen of the 19 total Ba results were detects, and the concentration range was from 27.1 µg/L to 4830 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 7680 µg/L, which is 1.6 times the maximum total Ba background concentration.

Beryllium (Be)

Five of the 19 dissolved Be results were detects, which is not a sufficient number of detects to calculate a UTL value.

Eighteen of the 19 total Be results were detects, and the concentration range of detects was from 0.4 µg/L to 59.3 µg/L. These data do not appear to follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The UTL value is 86.9 µg/L, which is 1.5 times the maximum total Be background concentration.

Boron (B)

Seven of the 19 dissolved B results were detects, and the concentration range of detects was from 16 µg/L to 29.5 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 30 µg/L, which is comparable to the maximum dissolved B background concentration.

Seventeen of the 19 total B results were detects, and the concentration range of detects was from 16.5 µg/L to 46.1 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 56 µg/L, which is 1.2 times the maximum total B background concentration.

Cadmium (Cd)

Only 1 of the 19 dissolved Cd results was detected, which is not a sufficient number of detects to calculate a UTL value.

Fifteen of the 19 total Cd results were detects, and the concentration range of detects was from 1.1 µg/L to 6.7 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 7.3 µg/L, which is 1.09 times the maximum background concentration for total Cd results.

Calcium (Ca)

All 19 dissolved Ca results were detects, and the concentration range was 2.95 mg/L to 18.8 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 21 mg/L, which is 1.1 times the maximum dissolved Ca background concentration.

All 19 total Ca results were detects, and the concentration range was 8.66 mg/L to 186 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 254 mg/L, which is 1.4 times the maximum total Ca background concentration.

Chloride (Cl)

All 15 dissolved Cl results were detects, and the concentration range was 0.316 mg/L to 3.11 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 4.03 mg/L, which is 1.3 times the maximum dissolved Cl concentration.

None of the nonfiltered storm water runoff samples were analyzed for Cl; typically Cl analyses are performed on filtered water samples.

Chromium (Cr)

None of the 19 dissolved Cr results were detects, which is not a sufficient number of detects to calculate a UTL value.

Fifteen of the 19 total Cr results were detects, and the concentration range of detects was from 2.7 mg/L to 51.2 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 98.2 mg/L, which is 1.9 times the maximum Cr background concentration.

Cobalt (Co)

Fourteen of the 19 dissolved Co results were detects, and the concentration range of detects was from 1.5 µg/L to 7 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 7.53 µg/L, which is 1.07 times the maximum dissolved Co background concentration.

Sixteen of the 19 total Co results were detects, the concentration range of detects was from 1.4 µg/L to 161 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 322 µg/L, which is 2 times the maximum total Co background concentration.

Copper (Cu)

Fifteen of the 19 dissolved Cu results were detects, and the concentration range of detects was 0.79 µg/L to 4.1 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 3.43 µg/L, which is within the dissolved Cu background concentration.

All 19 total Cu results were detects, and the concentration range was 1.2 µg/L to 104 µg/L. The maximum value of 104 µg/L appears suspect in the probability plots, but it was retained because the suspended Cu concentration calculated for that sample was consistent with that in other Cu samples. These data appear to originate from a gamma statistical distribution. The UTL value is 103 µg/L, which is within the range of total Cu background concentrations.

Gross Alpha (GA) Radioactivity

None of the storm runoff samples were analyzed for dissolved gross-alpha radioactivity; typically GA analysis is performed on nonfiltered water.

All 14 total GA results were detects, and the activity range was 9.93 pCi/L to 1090 pCi/L. These data appear to originate from a gamma statistical distribution. The UTL value is 1490 pc/L, which is 1.4 times the maximum total GA background activity.

Hardness

Nineteen hardness values were calculated from the 19 calcium and manganese detects, and the values range from 9.6 mg/L to 62.8 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 74 mg/L, which is 1.18 times the maximum dissolved hardness urban baseline concentration.

Hardness was not calculated for any of the nonfiltered storm water samples. Hardness in this report is the sum of dissolved calcium and magnesium in filtered water samples. Dissolved constituents are bioavailable and available to complex with other species in solution.

Iron (Fe)

All 18 dissolved Fe results were detects, and the concentration range of detects was 34 µg/L to 1060 µg/L. A value of 38,400 µg/L was identified as a suspect value and removed from the data set (second largest value was 1060 µg/L or more than 5 times this value). The data appear to originate from a gamma statistical distribution. The UTL is 1500 µg/L, which is 1.45 times the maximum dissolved Fe background concentration.

All 19 total Fe results were detects, and the concentration range of detects was 59.5 µg/L to 157,000 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 203,000 µg/L, which is 1.3 times the maximum total Fe background concentration.

Lead (Pb)

Seven of the 18 dissolved Pb results were detects, and the concentration range of detects was 0.52 µg/L to 2.3 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 9.03 µg/L, which is 4 times the maximum dissolved Pb background concentration.

All 19 total Pb results were detects, and the concentration range was 0.51 µg/L to 393 µg/L. These data do not follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The UTL value is 393 µg/L, which is equal to the maximum total background concentration.

Magnesium (Mg)

All 19 dissolved Mg results were detects, and the concentration range was 0.45 mg/L to 8.94 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 7.95 µg/L, which is within the dissolved Mg background concentration range.

All 19 total Mg results were detects, and the concentration range was 1.72 mg/L to 43 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 52.6 µg/L, which is 1.2 times the maximum total Mg background concentration.

Manganese (Mn)

Seventeen of the 19 dissolved Mn results were detects, and the concentration range of detects was 4.8 µg/L to 2630 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 1050 µg/L, which is within the dissolved Mn background concentration range.

All 19 total Mn results were detects, and the concentration range was 6.5 µg/L to 37,900 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 43,800 µg/L, which is 1.16 times the maximum total Mn background concentration.

Nickel (Ni)

Eighteen of the 19 dissolved Ni results were detects, and the concentration range of detects was 0.59 µg/L to 3.4 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 3.53 µg/L, which is 1.04 times the maximum dissolved Ni background concentration.

Eighteen of the 19 total Ni results were detects, and the concentration range of detects was 2.4 µg/L to 120 µg/L. These data appear to originate from a gamma distribution. The UTL value is 220 µg/L, which is 1.8 times the maximum total background Ni concentration.

Radium-226 and -228 (Ra-226 + -228)

None of the storm runoff samples were analyzed for dissolved radium-226 and -228 radioactivity; typically, radium-226 and -228 analysis is performed on nonfiltered water.

Seven of the 8 total radium-226 + -228 results were detects, and the activity range of detects was 7.39 pCi/L to 37.8 pCi/L. These data appear to originate from a normal statistical distribution. The UTL value is 52.7 pC/L, which is 1.4 times the maximum total Ra-226 + -228 background activity.

Sodium (Na)

All 19 dissolved Na results were detects, and the concentration range was 0.349 mg/L to 7.96 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 12.1 mg/L, which is 1.5 times the dissolved Na background maximum concentration.

Eighteen of the 19 total Na results were detects, and the concentration range of detects was 0.95 mg/L to 7.95 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 9.41 mg/L, which is 1.18 times the maximum total Na background Na concentration.

Sulfate (SO_4)

All 15 dissolved SO_4 results were detects, and the concentration range was 0.509 mg/L to 12.8 mg/L. These data do not follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The UTL value is 12.8 mg/L, which is equal to the maximum dissolved SO_4 background concentration.

None of the nonfiltered samples were analyzed for SO_4; typically, SO_4 analysis is performed on filtered water samples.

Uranium (U)

Thirteen of the 19 dissolved U results were detects, and the concentration range of detects was 0.05 μg/L to 0.71 μg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 0.52 μg/L, which is within the dissolved U background range.

Eighteen of the 19 total U results were detects, and the concentration range of detects was 0.24 μg/L to 18.7 μg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 24 μg/L, which is 1.3 times the maximum total U background concentration.

Vanadium (V)

Sixteen of the 18 dissolved V results were detects, and the concentration range of detects was 1.4 μg/L to 5 μg/L. A value of 49.1 μg/L was identified as suspect and removed from the data set. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 5.77 μg/L, which is 1.2 times the maximum dissolved V background concentration.

Eighteen of the 19 total V results were detects, and the concentration range of detects was 6.1 μg/L to 197 μg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 379 μg/L which is 1.9 times the maximum total V background concentration.

Zinc

Twelve of the 18 dissolved Zn results were detects, and the concentration range of detects was 3.9 μg/L to 170 μg/L. The maximum value of 170 μg/L was identified as possibly suspect, but the value was aligned with other results on the probability plot, judged not to be an isolated result, and retained. These data do not follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The UTL value is 109 μg/L, which is within the dissolved Zn background concentration range.

Eighteen of the 19 total Zn results were detects, and the concentration range was 7.7 μg/L to 1150 μg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 1350 μg/L, which is 1.2 times the maximum total Zn background concentration.

5.2 Western Boundary Background Stations

A total of 12 runoff samples were collected from the Western Boundary stations in 2009 and 2010. The results reflect background runoff conditions from landscapes with surficial geological materials derived from the Bandelier Tuff and diorite-rich Tschicoma Formation.

5.2.1 Summary Statistics of Western Boundary Area Background Runoff

A summary of dissolved and total concentrations measured in background runoff samples collected along the Western Boundary are presented in Tables 6 and 7. The tables include all results, except for identified suspect values. Suspect values are discussed in the subsequent UTL results section to follow. The complete results, including suspect values, are provided in Appendix B.

Table 6
Dissolved Concentration Ranges in Western Boundary Area Background Storm Water Runoff

Analyte	Number of Detects	Number of Nondetects	% Nondetects	Raw Statistics Using Detected Results				
				Min	Max	Mean	Median	Std Dev
Aluminum	12	0	0	81.5	1560	353	210.5	413.2
Antimony	0	12	100	n/a*	n/a	n/a	n/a	n/a
Arsenic	0	12	100	n/a	n/a	n/a	n/a	n/a
Barium	12	0	0	7.6	28.2	14.89	13.2	6.354
Beryllium	0	12	100	n/a	n/a	n/a	n/a	n/a
Boron	0	12	100	n/a	n/a	n/a	n/a	n/a
Cadmium	0	12	100	n/a	n/a	n/a	n/a	n/a
Calcium (mg/L)	12	0	0	2.94	11	5.57	5.315	2.456
Chloride (mg/L)	11	0	0	1.31	23.7	8.099	4.33	7.113
Chromium	0	12	100	n/a	n/a	n/a	n/a	n/a
Cobalt	7	5	42	1	3.4	2.643	2.7	0.776
Copper	12	0	0	0.46	4.8	2.447	2.2	1.19
Dissolved Organic Carbon (mg/L)	4	0	0	7.49	17.7	11.45	10.3	4.7
Hardness (mg/L)	12	0	0	9.2	43.8	18.37	17.15	9.973
Iron	12	0	0	41.3	1080	236.7	121.5	289.1
Lead	3	9	75	0.67	2.2	1.197	0.72	0.869
Magnesium (mg/L)	12	0	0	0.398	3.95	1.072	0.636	1.011
Manganese	11	1	8	2.3	29	12.45	13.8	7.844
Mercury	0	12	100	n/a	n/a	n/a	n/a	n/a
Nickel	10	2	17	0.52	1.2	0.824	0.8	0.254
Selenium	2	10	83	1.1	1.4	1.25	1.25	0.212
Silver	0	12	100	n/a	n/a	n/a	n/a	n/a
Sodium (mg/L)	12	0	0	4.73	15.7	8.749	8.52	3.415
Sulfate (mg/L)	11	0	0	1.41	3.45	2.119	2	0.617
Thallium	0	12	100	n/a	n/a	n/a	n/a	n/a
Uranium	0	12	100	n/a	n/a	n/a	n/a	n/a
Vanadium	11	1	8	1.3	4.1	2.164	2	0.867
Zinc	12	0	0	4	43.3	10.92	7.3	10.82

Note: Unit is µg/L unless otherwise indicated.
* n/a = Not applicable.

Table 7
Total Concentration Ranges in Western Boundary Background Storm Water Runoff

Analyte, Total	Number of Detects	Number of Nondetects	% Nondetects	Raw Statistics Using Detected Results				
				Min	Max	Mean	Median	StdDev
Aluminum	12	0	0	433	28100	11036	11150	8745
Antimony	2	10	83	0.52	0.55	0.535	0.535	0.0212
Arsenic	5	7	58	2.2	5.6	3.54	3.5	1.284
Barium	12	0	0	27.5	400	146.7	150	106.6
Beryllium	11	1	8	0.1	2.3	0.795	0.83	0.622
Boron	2	10	83	16.7	22.5	19.6	19.6	4.101
Cadmium	9	3	25	0.11	0.8	0.342	0.28	0.213
Calcium (mg/L)	12	0	0	4.71	17	9.664	10.55	3.816
Chromium	11	1	8	2.6	23	9.418	7.6	6.959
Cobalt	9	3	25	2	9.2	5	4.9	2.262
Copper	12	0	0	1.6	37.9	16.25	13.85	10.6
Gross Alpha (pCi/L)	9	4	31	6.31	125	28.77	16.6	37.14
Iron	12	0	0	285	27,500	7238	5355	7726
Lead	11	1	8	2.5	117	31.38	21.9	33.87
Magnesium (mg/L)	12	0	0	0.644	7.17	2.906	2.4	1.697
Manganese	12	0	0	3.5	1420	453.8	399	405.6
Mercury	0	10	100	n/a*	n/a	n/a	n/a	n/a
Nickel	11	1	8	1.4	19.5	7.882	8	5.261
Radium-226 and -228 (pCi/L)	3	1	25	1.39	2.1	1.677	1.54	0.374
Selenium	0	12	100	n/a	n/a	n/a	n/a	n/a
Silver	1	11	92	0.24	0.24	0.24	0.24	n/a
Sodium (mg/L)	12	0	0	5.5	16.7	9.433	8.985	3.605
Thallium	4	8	67	0.35	0.95	0.59	0.53	0.256
TOC (mg/L)	15	0	0	3.41	18.7	9.277	8.24	4.575
Uranium	10	2	17	0.17	2.3	0.881	0.775	0.621
Vanadium	12	0	0	4	41.2	14.02	12.1	10.82
Zinc	12	0	0	3.5	697	168.6	125.5	189.7

Note: Unit is µg/L unless otherwise indicated.
* n/a = Not applicable.

5.2.2 Western Boundary Storm Water BVs

This section focuses on those analytes with seven or more detections to calculate meaningful and representative UTLs. Analytes that do not have at least seven detections in either filtered or nonfiltered samples are not discussed. The proposed dissolved BVs for the Western Boundary locations are summarized in Table 8, and the proposed total BVs are summarized in Table 9. The SSCs for the Western Boundary are presented in Table 10.

Table 8
Summary of Dissolved BVs for Western Boundary Storm Water Runoff

Analytes	Dissolved Concentrations		
	Sufficient Number of Detects?	Distribution	UTL: 95,95[a] (µg/L)
Aluminum	Yes	Gamma	1780
Antimony	No	—[b]	—
Arsenic	No	—	—
Barium	Yes	Normal	32.3
Beryllium	No	—	—
Boron	No	—	—
Cadmium	No	—	—
Calcium (mg/L)	Yes	Normal	12.3
Chloride (mg/L)	Yes	Normal	28.1
Chromium	No	—	—
Cobalt	Yes	Nonparametric	4.64
Copper	Yes	Normal	5.7
Iron	Yes	Gamma	1250
Hardness (mg/L)	Yes	Gamma	52.3
Lead	No	—	—
Magnesium (mg/L)	Yes	Gamma	4.51
Manganese	Yes	Normal	33.9
Mercury	No	—	—
Nickel	Yes	Normal	1.54
Selenium	No	—	—
Silver	No	—	—
Sodium (mg/L)	Yes	Normal	18.1
Sulfate (mg/L)	Yes	Normal	3.86
Thallium	No	—	—
Uranium	No	—	—
Vanadium	Yes	Lognormal	5.86
Zinc	Yes	None[c]	43.3

[a] UTL = 95% UTL with 95% coverage. Seven or more detections assumed needed for meaningful evaluation of distribution and calculation of UTLs.

[b] — = Insufficient number of detections to calculate statistical distribution.

[c] None = No discernible distribution (p=0.05); nonparametric.

Table 9
Summary of Total BVs for Western Boundary Storm Water Runoff

Analytes	Total Concentrations		
	Sufficient Number of Detects?	Distribution	UTL: 95,95[a] (µg/L)
Aluminum	Yes	Normal	35,000
Antimony	No	—[b]	—
Arsenic	No	—	—
Barium	Yes	Normal	438
Beryllium	Yes	Normal	2.46
Boron	No	—	—
Cadmium	Yes	Normal	0.931
Calcium (mg/L)	Yes	Normal	20.1
Chromium	Yes	Normal	27.9
Cobalt	Yes	Normal	11.6
Copper	Yes	Normal	45.3
Gross Alpha (pCi/L)	Yes	KM[c]	104
Iron	Yes	Gamma	42,300
Lead	Yes	Gamma	226
Magnesium (mg/L)	Yes	Normal	7.55
Manganese	Yes	Normal	1560
Mercury	No	—	—
Nickel	Yes	Normal	22.4
Radium-226+228 (pCi/L)	No	—	—
Selenium	No	—	—
Silver	No	—	—
Sodium (mg/L)	Yes	Normal	19.3
Thallium	No	—	—
Uranium	Yes	KM	2.4
Vanadium	Yes	Gamma	54.8
Zinc	Yes	Gamma	1060

[a] UTL = 95% UTL with 95% coverage. Seven or more detections assumed needed for meaningful evaluation of distribution and calculation of UTLs.

[b] — = Insufficient number of detections to calculate statistical distribution.

[c] KM = Kaplan-Meier method used when data set contained multiple detection limits.

Table 10
Summary of Suspended Sediment BVs for Western Boundary Storm Water Runoff

Analyte	Suspended Concentrations		
	Sufficient Number of Detects?	Distribution	UTL: 95,95[a] (mg/kg)
Aluminum	Yes	Normal	53000
Antimony	No	—[b]	—
Arsenic	No	—	—
Barium	Yes	Normal	564
Beryllium	Yes	Normal	2.69
Boron	No	—	—
Cadmium	Yes	Normal	0.982
Calcium	Yes	Gamma	98,400
Chromium	Yes	Normal	53.2
Cobalt	Yes	Normal	17.6
Copper	Yes	Gamma	147
Gross Alpha (pCi/g)	Yes	Normal	82.1
Iron	Yes	Normal	40,100
Lead	Yes	Normal	91.7
Magnesium	Yes	Normal	16,400
Manganese	Yes	Normal	1520
Nickel	Yes	Normal	32.1
Radium-226 and -228 (pCi/g)	Yes	Lognormal	39.1
Silver	No	—	—
Sodium	Yes	Gamma	19,2000
Thallium	No	—	—
Uranium	Yes	Normal	2.99
Vanadium	Yes	Normal	82
Zinc	Yes	Normal	803

[a] UTL = 95% UTL with 95% coverage. Seven or more detections assumed needed for meaningful evaluation of distribution and calculation of UTLs.

[b] — = Insufficient number of detections to calculate statistical distribution.

Aluminum (Al)

All 12 dissolved Al results were detects, and the concentration range was from 81.5 µg/L to 1560 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 1780 µg/L, which is 1.1 times the maximum dissolved Al background concentration.

All 12 total Al results were detects, and the concentration range was from 433 to 28,100 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 35,000 µg/L, which is 1.25 times the maximum total Al background concentration.

Barium (Ba)

All 12 dissolved Ba results were detects, and the concentration range was from 7.6 µg/L to 28.2 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 32.3 µg/L, which is 1.1 times the maximum dissolved Ba background concentration.

All 12 total Ba results were detects, and the concentration range was from 27.5 µg/L to 400 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 438 µg/L, which is 1.07 times the maximum total Ba background concentration.

Beryllium (Be)

None of the 12 dissolved Be results were detects, which is an insufficient number of detects to calculate a UTL value.

Eleven of the 12 total Be results were detects, and the concentration range was from 0.1 µg/L to 2.3 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 2.46 µg/L, which is 1.07 times the maximum total Be background concentration.

Cadmium (Cd)

None of the 12 dissolved Cd results were detects, which is an insufficient number of detects to calculate a UTL value.

Nine of the 12 total Cd results were detects, and the concentration range was 0.11 µg/L to 0.8 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 0.931 µg/L, which is 1.16 times the maximum total Cd background concentration.

Calcium (Ca)

All 12 dissolved Ca results were detects, and the concentration range was 2.9 mg/L to 11 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 12.3 mg/L, which is 1.1 times the maximum dissolved Ca background concentration.

All 12 total Ca results were detects, and the concentration range was 4.7 mg/L to 17 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 20.1 mg/L, which is 1.18 times the maximum total Ca background concentration.

Chloride (Cl)

All 11 dissolved Cl results were detects, and the concentration range was 1.3 mg/L to 23.7 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 28.1 mg/L, which is 1.2 times the maximum dissolved Cl background concentration.

None of the nonfiltered storm water runoff samples were analyzed for Chloride. Chloride analyses are typically performed on filtered water.

Chromium (Cr)

None of the 12 dissolved Cr results were detects, which is an insufficient number of detects to calculate a UTL value.

Eleven of the 12 total Cr results were detects, and the concentration range of detects was from 2.6 μg/L to 23 μg/L. These data appear to originate from a normal statistical distribution. The UTL value is 27.9 μg/L, which is 1.2 times the maximum total Cr background concentration.

Cobalt (Co)

Seven of the 12 dissolved Co results were detects, and the concentration range of detects was 1 μg/L to 3.4 μg/L. These data do not follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The UTL value is 4.64 μg/L, which is 1.37 times the maximum dissolved Co background concentration.

Nine of the 12 total Co results were detects, and the concentration range of detects was 2 μg/L to 9.2 μg/L. These data appear to originate from a normal statistical distribution. The UTL value is 11.6 μg/L, which is 1.26 times the maximum total Co background concentration.

Copper (Cu)

All 12 dissolved Cu results were detects, and the concentration range was 0.46 μg/L to 4.8 μg/L. These data appear to originate from a normal statistical distribution. The UTL value is 5.7 μg/L, which is 1.2 times the maximum dissolved Cu background concentration.

All 12 total Cu results were detects, and the concentration range was 1.6 μg/L to 37.9 μg/L. These data appear to originate from a normal statistical distribution. The UTL value is 45.3 μg/L, which is 1.2 times the maximum total Cu background concentration.

Gross-Alpha Radioactivity (GA)

None of the Western Boundary area samples were analyzed for dissolved GA radioactivity. GA analyses are typically performed on nonfiltered water.

Nine of the 13 total GA results were detects, and the activity range was 6.31 pCi/L to 125 pCi/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 104 pCi/L, which is within the total GA background activity range.

Hardness (Ca + Mg)

All 12 dissolved hardness results for the Western Boundary stations were detects, and the range was 9.2 pCi/L to 43.8 mg/L. These data appear to be derived from a gamma statistical distribution. The UTL value is 52.3 mg/L, which is 1.19 times the maximum dissolved hardness background concentration for the Western Boundary stations.

Hardness was not calculated for any of the nonfiltered storm water samples. Hardness in this report is the sum of dissolved calcium and magnesium in filtered water samples. Dissolved constituents are generally bioavailable and are free to complex with other species in solution.

Iron (Fe)

All 12 dissolved Fe results were detects, and the concentration range was 41.3 μg/L to 1080 μg/L. The data appear to originate from a gamma statistical distribution. The UTL is 1250 μg/L, which is 1.16 times the maximum dissolved Fe background concentration.

All 12 total Fe results were detects, and the concentration range was 285 µg/L to 27,500 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 42,300 µg/L, which is 1.5 times the maximum total Fe background concentration.

Lead (Pb)

Three of the 12 dissolved Pb results were detects, which is an insufficient number of detects to calculate a UTL value.

Eleven of the 12 total Pb results were detects, and the concentration range was 2.5 µg/L to 117 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 226 µg/L, which is 1.9 times the maximum total Pb background concentration.

Magnesium (Mg)

All 12 dissolved Mg results were detects, and the concentration range was 0.398 mg/L to 3.95 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 4.51 mg/L, which is 1.1 times the maximum dissolved Mg background concentration.

All 12 total Mg results were detects, and the concentration range was 0.644 mg/L to 7.17 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 7.55 mg/L, which is 1.05 times the maximum dissolved Mg background concentration.

Manganese (Mn)

Eleven of the 12 dissolved Mn results were detects, and the concentration range was 2.3 µg/L to 29 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 33.9 µg/L, which is 1.17 times the maximum dissolved Mn background concentration.

All 12 total Mn results were detects, and the concentration range was 3.5 µg/L to 1420 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 1560 µg/L, which is 1.1 times the maximum total Mn background concentration.

Nickel (Ni)

Ten of the 12 dissolved Ni results were detects, and the concentration range was 0.52 µg/L to 1.2 µg/L. These data appear to originate from a normal statistical distribution. The UTL value is 1.54 µg/L, which is 1.3 times the maximum dissolved Ni background concentration.

Eleven of the 12 total Ni results were detects, and the concentration range was 1.4 µg/L to 19.5 µg/L. These data appear to originate from a normal distribution. The UTL value is 22.4 µg/L, which is 1.15 times the maximum total Ni background concentration.

Sodium (Na)

All 12 dissolved Na results were detects, and the concentration range was 4.73 mg/L to 15.7 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 18.1 mg/L, which is 1.15 times the maximum dissolved Na background concentration.

All 12 total Na results were detects, and the concentration range was 5.5 mg/L to 16.7 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 19.3 mg/L, which is 1.16 times the maximum total Na background concentration.

Sulfate (SO_4)

All 11 dissolved SO_4 results were detects, and the concentration range was 1.41 mg/L to 3.45 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 3.86 mg/L, which is 1.12 times the maximum dissolved SO_4 background concentration.

None of the nonfiltered samples were analyzed for SO. Typically, SO_4 analysis is performed on filtered water samples.

Uranium (U)

None of the 12 dissolved U results were detects, which is an insufficient number of detects to calculate a UTL value.

Ten of the 12 total U results were detects, and the concentration range was 0.17 μg/L to 2.3 μg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 2.4 μg/L, which is equivalent to the maximum total U background concentration.

Vanadium (V)

Eleven of the 12 dissolved V results were detects, and the concentration range was 1.3 μg/L to 4.1 μg/L. These data contained appear to originate from a lognormal statistical distribution. The UTL value is 5.86 μg/L, which is 1.4 times the maximum dissolved V background concentration.

All 12 total V results were detects, and the concentration range was 4 μg/L to 41.2 μg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 54.8 μg/L, which is 1.3 times the maximum total V background concentration.

Zinc (Zn)

All 12 dissolved Zn results were detects, and the concentration range was 4 μg/L to 43.3 μg/L. These data do not follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The UTL value is 43.3 μg/L, which is equal to the maximum dissolved Zn background concentration.

All 12 total Zn results were detects, and the concentration range was 3.5 μg/L to 697 μg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 1060 μg/L, which is 1.5 times the maximum total Zn background concentration.

5.3 Urban Baseline Storm Water Runoff Monitoring Stations

Storm water samples were collected from the urban runoff monitoring stations from 2008 to 2012. The results from the stations were combined to establish a data set that reflects baseline urban runoff conditions.

5.3.1 Summary Statistics of Baseline Urban Storm Water Runoff

A summary of dissolved and total concentrations measured in baseline storm water runoff samples is presented in Tables 11 and 12. The tables include all results, except for identified suspect values. Suspect values are discussed in when appropriate below. The complete results, including suspect values, are provided in Appendix B.

Table 11
Dissolved Concentration Ranges in Urban Runoff Baseline Samples

Analyte	Number of Detects	Number of Nondetects	% Nondetects	Raw Statistics using Detected Results				
				Min	Max	Mean	Median	StdDev
Aluminum	45	7	13	10.7	309	98.98	83.1	77.33
Antimony	18	30	62	0.64	23.2	3.791	1.95	5.356
Arsenic	10	43	81	1.8	3.53	2.376	2.25	0.532
Barium	20	0	0	10.9	94.2	33.07	33.7	21.08
Beryllium	2	17	89	0.14	0.15	0.145	0.145	0.00707
Boron	36	15	29	15.8	69.9	26.52	22.8	12.8
Bromide	1	24	96	0.157	0.157	0.157	0.157	n/a*
Cadmium	11	42	79	0.131	0.894	0.334	0.247	0.211
Calcium	52	0	0	2.09	40.4	14.59	13.2	8.129
Chloride (mg/L)	26	0	0	2.38	240	31.03	11.3	60.09
Chromium	12	41	77	2	7.3	3.301	3.045	1.471
Cobalt	39	12	24	0.446	6.7	2.431	1.97	1.538
Copper	53	0	0	2	31.8	10.17	7.21	6.855
Dissolved Organic Carbon (mg/L)	44	0	0	8.07	169	43.19	31.95	36.02
Fluoride (mg/L)	25	0	0	0.0789	0.415	0.167	0.144	0.0876
Hardness (mg/L)	53	0	0	5.98	125	41.51	36.1	23.82
Iron	18	3	14	32.5	2410	525.9	129.5	772
Lead	20	33	62	0.51	7.1	1.504	0.649	1.802
Magnesium (mg/L)	53	0	0	0.181	5.73	1.232	0.913	1.068
Manganese	18	1	5	2.5	625	93.71	21.2	168.9
Mercury	0	51	100	n/a	n/a	n/a	n/a	n/a
Nickel	51	0	0	0.59	9.13	2.848	2.3	1.912
Nitrate (mg/L)	22	3	12	0.1	1.44	0.655	0.615	0.418
Nitrite (mg/L)	21	4	16	0.0565	0.346	0.132	0.101	0.0774
Phosphorous, as PO_4 (mg/L)	1	24	96	0.125	0.125	0.125	0.125	n/a
Potassium (mg/L)	51	0	0	1.03	10.3	4.344	3.7	2.369
Selenium	1	52	98	1.68	1.68	1.68	1.68	n/a
Silver	0	53	100	n/a	n/a	n/a	n/a	n/a
Sodium (mg/L)	51	0	0	0.923	101	14.9	11.5	19.47
Sulfate (mg/L)	26	0	0	1.52	12.9	5.078	4.485	3.064
Thallium	3	50	94	0.38	0.58	0.463	0.43	0.104
Uranium	6	13	68	0.053	0.28	0.148	0.135	0.0852
Vanadium	41	6	13	1.2	24.1	3.649	3.01	3.683
Zinc	53	0	0	7	882	181	73.6	238.2

Note: Unit is µg/L unless otherwise indicated.
*n/a = Not Applicable

Table 12
Total Concentration Ranges in Urban Runoff Baseline Samples

Analyte	Number of Detects	Number of Nondetects	% Nondetects	Raw Statistics Using Detected Results				
				Min	Max	Mean	Median	StdDev
Acidity or Alkalinity (pH)	25	0	0	6.29	9.22	6.886	6.84	0.566
Alkalinity (CO3)	0	25	100	n/a*	n/a	n/a	n/a	n/a
Alkalinity (CO3 + HCO3)	25	0	0	11.5	91.7	36.76	35.6	18.94
Alkalinity (HCO3)	25	0	0	11.5	91.7	36.76	35.6	18.94
Aluminum	51	0	0	526	22700	5179	3880	5004
Antimony	21	24	53	1.05	21.5	3.906	2.23	4.531
Arsenic	32	19	37	1.5	7.3	3.183	2.995	1.359
Barium	20	0	0	16.2	308	92.28	62.3	75.67
Beryllium	16	3	16	0.1	1.5	0.464	0.35	0.409
Boron	35	14	29	16.8	71.4	28.02	24.9	12.2
Cadmium	40	11	22	0.12	2.17	0.495	0.303	0.43
Calcium (mg/L)	51	0	0	2.51	57.6	16.7	15	10.4
Chromium	43	8	16	2.19	46.2	9.809	7.6	8.185
Cobalt	40	9	18	0.378	22.2	3.12	2.225	3.648
Copper	51	0	0	4.3	142	30.49	27.1	22.96
Cyanide, Weak Acid Dissociable (mg/L)	7	22	76	0.0019	0.00377	0.00268	0.00238	7.18E-04
Gross Alpha (pCi/L)	32	12	27	2.82	71	10.43	5.87	13.14
Iron	21	0	0	148	20700	4394	2380	5296
Lead	49	2	4	0.573	234	30.28	11.5	51.64
Magnesium (mg/L)	51	0	0	0.359	7.71	2.262	1.86	1.714
Manganese	19	0	0	20.7	900	202.3	88.8	246.7
Mercury	2	47	96	0.149	0.286	0.218	0.218	0.0969
Nickel	49	0	0	1.1	33.9	6.95	5.49	5.898
Potassium (mg/L)	49	0	0	1.39	14	5.461	4.74	3.154
Radium-226 (pCi/L)	11	15	58	0.405	13.2	2.552	0.94	3.822
Radium-226 + -228 (pCi/L)	9	16	64	1.17	15.5	4.05	2.54	4.58
Radium-228 (pci/L)	9	17	65	0.67	2.28	1.372	1.19	0.552
Selenium	0	51	100	n/a	n/a	n/a	n/a	n/a
Silver	7	44	86	0.2	0.39	0.249	0.239	0.0643
Sodium (mg/L)	49	0	0	0.976	107	13.41	9.35	16.32
SSC (mg/L)	21	0	0	17.9	920	229.4	131	252.4
Thallium	1	50	98	0.33	0.33	0.33	0.33	n/a
TSS (mg/L)	30	0	0	17.2	17200	893.2	149.5	3131
Uranium	15	4	21	0.057	1.9	0.618	0.4	0.534
Vanadium	45	1	2	1.25	41.4	10.57	7.91	8.794
Zinc	51	0	0	21.3	2290	450.6	326	478

Note: Unit is µg/L unless otherwise indicated.
*n/a = Not applicable.

5.3.2 Urban Storm Water Baseline Runoff Values

This study focuses on those analytes with seven or more detections for calculation of meaningful and reliable UTLs. Analytes that do not have at least seven detections in either filtered or nonfiltered samples are not discussed. The proposed dissolved urban storm water f baseline values are summarized in Table 13, and the proposed total urban storm water baseline values are summarized in Table 14. The suspended sediment baseline values for the urban storm water samples are presented in Table 15.

Alkalinity (HCO_3)

None of the samples were analyzed for dissolved alkalinity-HCO_3; alkalinity analyses are typically performed on nonfiltered water samples.

All 25 total HCO_3 were detects, and the concentration range was from 11.5 mg/L to 91.7 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 88.2 mg/L, which is within the total HCO_3 baseline range.

Aluminum (Al)

Forty-five of the 52 dissolved Al results were detects, and the concentration range of detects was from 10.7 µg/L to 309 µg/L. A value of 4290 µg/L was identified as a suspect value and removed from the data set. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 245 µg/L, which is within the dissolved Al baseline range.

All 52 total Al results were detects, and the concentration range was from 526 µg/L to 22,700 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 17,700 µg/L, which is within the total Al baseline range.

Antimony (Sb)

Eighteen of the 48 dissolved Sb results were detects, and the concentration range was from 0.64 µg/L to 23.2 µg/L. Four values (180 µg/L, 152 µg/L, 113 µg/L, and 97.7 µg/L) were identified as suspect and removed from the data set. All these results were from a single monitoring station, LA-ROM-4.1, and thus it was uncertain if the results reflected urban baseline conditions or a localized contaminant source. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 9.25 µg/L, which is within the dissolved Sb baseline range.

Twenty-one of the 45 total Sb results were detects, and the concentration range was from 1 µg/L to 21.5 µg/L. Four values (161 µg/L, 146 µg/L, 114 µg/L, and 105 µg/L) were identified as suspect and removed from the data set because all were from the same station LA-ROM-4.1; it was uncertain if the results reflected urban baseline conditions. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 9.36 µg/L, which is within the total Sb urban baseline concentration range.

Table 13
Summary of Dissolved Baseline Values for Urban Storm Water Runoff

Analyte	Dissolved Concentrations		
	Sufficient Number of Detects?	Distribution	UTL: 95,95[a] (µg/L)
Aluminum	Yes	KM[b]	245
Antimony	Yes	KM	9.25
Arsenic	Yes	KM	2.55
Barium	Yes	Gamma	98.8
Beryllium	No	—[c]	—
Boron	Yes	Nonparametric	47.3
Bromide (mg/L)	No	—	—
Cadmium	Yes	Gamma	0.36
Calcium (mg/L)	Yes	Normal	31.2
Chloride (mg/L)	Yes	Nonparametric	240
Chromium	Yes	KM	4.07
Cobalt	Yes	Gamma	9.20
Copper	Yes	Lognormal	32.3
Dissolved Organic Carbon (mg/L)	Yes	Gamma	132
Fluoride (mg/L)	Yes	Lognormal	0.413
Hardness (mg/L)	Yes	Gamma	105
Iron	Yes	KM	2150
Lead	Yes	Nonparametric	3.30
Magnesium (mg/L)	Yes	Lognormal	3.85
Manganese	Yes	Lognormal	625
Mercury	No	—	—
Nickel	Yes	Gamma	7.57
Nitrate (mg/L)	Yes	Normal	1.65
Nitrite (mg/L)	Yes	Gamma	0.66
Phosphorous as PO4 (mg/L)	No	—	—
Potassium (mg/L)	Yes	Gamma	10.3
Selenium	No	—	—
Silver	No	—	—
Sodium (mg/L)	Yes	Lognormal	62.5
Sulfate (mg/L)	Yes	Gamma	13.8
Thallium	No	—	—
Uranium	No	—	—
Vanadium	Yes	KM	10.6
Zinc	Yes	Lognormal	1120

[a] UTL = 95% UTL with 95% coverage. Seven or more detections assumed needed for meaningful evaluation of distribution and calculation of UTLs.

[b] KM = Kaplan-Meier method used when data set contained multiple detection limits.

[c] — = Insufficient number of detections to calculate statistical distribution.

Table 14
Summary of Total Baseline Values for Urban Storm Water Runoff

Analytes	Total Concentrations		
	Sufficient Number of Detections?	Distribution	UTL: 95,95 [a] (µg/L)
Acidity or alkalinity (pH)	Yes	Nonparametric	9.22
Alkalinity as CO3 (mg/L)	No	— [b]	—
Alkalinity as CO3 + HCO3 (mg/L)	Yes	Gamma	88.2
Alkalinity HCO3 (mg/L)	Yes	Gamma	88.2
Aluminum	Yes	Gamma	17,700
Antimony	Yes	KM [c]	9.36
Arsenic	Yes	KM	5.32
Barium	Yes	Gamma	339
Beryllium	Yes	Gamma	2.74
Boron	Yes	Nonparametric	48.2
Cadmium	Yes	KM	1.25
Calcium (mg/L)	Yes	Normal	38.1
Chromium	Yes	KM	24.9
Cobalt	Yes	Lognormal	11.0
Copper	Yes	Gamma	84.0
Cyanide, weak acid dissociable (mg/L)	Yes	Normal	0.004
Gross Alpha (pCi/L)	Yes	KM	32.5
Hardness (mg/L)	Yes	Normal	112
Iron	Yes	Gamma	22,500
Lead	Yes	KM	133
Magnesium (mg/L)	Yes	Gamma	6.33
Manganese	Yes	Gamma	1500
Mercury	No	—	—
Nickel	Yes	Gamma	21.2
Potassium (mg/L)	Yes	Gamma	13.2
Radium-226 and -228 (pCi/L)	Yes	KM	8.94
Selenium	No	—	—
Silver	Yes	Nonparametric	0.263
Sodium	Yes	Lognormal	52.2
Thallium	No	—	—
Uranium	Yes	KM	1.73
Vanadium	Yes	Gamma	32.2
Zinc	Yes	Gamma	1671

[a] UTL = 95% UTL with 95% coverage. Seven or more detections assumed needed for meaningful evaluation of distribution and calculation of UTLs.

[b] — = Insufficient number of detections to calculate statistical distribution.

[c] KM = Kaplan-Meier method used when data set contained multiple detection limits.

Table 15
Summary of Suspended Sediment Baseline Values for Urban Storm Water Runoff

Analyte	Suspended Concentrations		
	Sufficient Number of Detections?	Distribution	UTL: 95,95[a] (mg/kg)
Aluminum	Yes	Gamma	91,500
Antimony	Yes	Gamma	135
Arsenic	Yes	Gamma	58.6
Barium	Yes	Gamma	2010
Beryllium	Yes	Gamma	9.4
Boron	Yes	Gamma	660
Cadmium	Yes	Gamma	5.43
Calcium	Yes	Gamma	432,000
Chromium	Yes	Gamma	149
Cobalt	Yes	Nonparametric	161
Copper	Yes	Gamma	675
Cyanide, weak acid dissociable	No	—[b]	—
Gross Alpha (pCi/g)	Yes	Gamma	118
Iron	Yes	Gamma	124,000
Lead	Yes	Nonparametric	709
Magnesium	Yes	Gamma	48,100
Manganese	Yes	Gamma	4250
Mercury	No	—	—
Nickel	Yes	Gamma	118
Radium-226 and -228 (pCi/g)	Yes	Gamma	78.1
Silver	No	—	—
Sodium	Yes	Gamma	526,000
Thallium	No	—	—
Uranium	Yes	Gamma	17.3
Vanadium	Yes	Gamma	246
Zinc	Yes	Gamma	8044

[a] UTL = 95% UTL with 95% coverage. Seven or more detections assumed needed for meaningful evaluation of distribution and calculation of UTLs.

[b] — = Insufficient number of detections to calculate statistical distribution.

Arsenic (As)

Ten of the 53 dissolved As results were detects, and the concentration range of detects was from 1.8 µg/L to 3.53 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Meier nonparametric method. The UTL value is 2.55 µg/L, which is within the dissolved As baseline range.

Thirty-two of the 51 total As results were detects, and the concentration range of detects was from 1.5 µg/L to 7.3 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 5.32 µg/L, which is within the total As baseline range.

Barium (Ba)

All 20 dissolved Ba results were detects, and the concentration range was from 10.9 µg/L to 94.2 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 98.8 µg/L, which is 1.05 times the maximum dissolved Ba baseline range.

All 20 total Ba results were detects, and the concentration range was from 16.2 µg/L to 308 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 339 µg/L, which is 1.1 times the maximum total Ba baseline concentration.

Beryllium (Be)

Two of the 19 dissolved Be results were detects, which is an insufficient number of detects to calculate a UTL value.

Sixteen of the 19 total Be results were detects, and the concentration range was from 0.1 µg/L to 1.5 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 2.74 µg/L, which is 1.8 times the maximum total Be baseline concentration.

Boron (B)

Thirty-six of the 51 dissolved B results were detects, and the concentration range was from 15.8 µg/L to 69.9 µg/L. These data do not follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The UTL value is 47.3 µg/L, which is within the dissolved B baseline range.

Thirty-five of the 49 total B results were detects, and the concentration range was from 16.8 µg/L to 71.4 µg/L. These data do not follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The UTL value is 48.2 µg/L, which is within the total B baseline range.

Cadmium (Cd)

Eleven of the 53 dissolved Cd results were detects, and the concentration range was from 0.131 µg/L to 0.894 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 0.36, which is within the dissolved Cd baseline range.

Forty of the 51 total Cd results were detects, and the concentration range was from 0.12 µg/L to 2.17 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 1.25 µg/L, which is within the total Cd baseline range.

Calcium (Ca)

All 52 dissolved Ca results were detects, and the concentration range was from 2.09 mg/L to 40.4 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 31.2 mg/L, which is within the dissolved Ca baseline range.

All 51 total Ca results were detects, and the concentration range was from 2.51 mg/L to 57.6 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 38.1 mg/L, which is within the total Ca baseline range.

Chloride (Cl)

All 26 dissolved Cl results were detects, and the concentration range was from 2.4 mg/L to 240 mg/L. These data do not follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The larger concentrations likely reflect the effects of road salt at two locations that receive direct runoff from roads (see dissolved sodium narrative below). The UTL value is 240 mg/L, which is equal to the maximum dissolved Cl baseline range.

None of the nonfiltered samples were analyzed for Cl. Chloride analyses are typically performed on filtered water samples.

Chromium (Cr)

Twelve of the 53 dissolved Cr results were detects, and the concentration range was from 2 µg/L to 7.3 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 4.07 µg/L, which is within the dissolved Cr baseline range.

Forty-three of the 51 total Cr were detects, and the concentration range was from 2.19 µg/L to 46.2 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 24.9 µg/L, which is within the total Cr baseline range

Cobalt (Co)

Thirty-nine of the 51 dissolved Co results were detects, and the concentration range of detects was from 0.446 µg/L to 6.7 µg/L. These data appear to be derived from a gamma statistical distribution. The UTL value is 9.2 µg/L, which is 1.37 times the maximum dissolved Co baseline concentration.

Forty of the 49 total Co results were detects, and the concentration range was from 0.378 µg/L to 22.2 µg/L. These data appear to be derived from a lognormal statistical distribution. The UTL value is 11 µg/L, which is within the total Co baseline concentration range.

Copper (Cu)

All 54 dissolved Cu results were detects, and the concentration range was from 2 µg/L to 31.8 µg/L. These data appear to originate from a lognormal statistical distribution. The UTL value is 32.3 µg/L, which is comparable to the maximum dissolved Cu baseline range.

All 51 total Cu results were detects, and the concentration range of detects was from 4.3 µg/L to 14 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 84.0 µg/L, which is within the total Cu urban baseline concentration range.

Cyanide, Weak Acid Dissociable (CN WAD)

None of the storm water runoff samples were analyzed for dissolved cyanide (weak acid dissociable [WAD]); CN WAD analyses is typically performed on nonfiltered water samples.

Seven of the 29 CN WAD results were detects, and the concentration range of detects was from 0.0019 mg/L to 0.00377 mg/L. These data appear to be derived from a normal statistical distribution. The UTL value is 0.004 mg/L, which is 1.06 times the CN WAD baseline range.

Fluoride (F)

All 25 dissolved F results were detects, and the concentration range was from 0.079 mg/L to 0.415 mg/L. These data appear to originate from a lognormal statistical distribution. The UTL value is 0.413 mg/L, which is within the dissolved F baseline range.

None of the nonfiltered storm water samples were analyzed for F; F analyses is typically performed on filtered water samples.

Hardness (Ca + Mg)

Fifty-three hardness values calculated from the 53 calcium and manganese detects, and the values range from 5.98 mg/L to 125 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 105 mg/L, which is within the dissolved hardness baseline range.

Hardness was not calculated for any of the nonfiltered storm water samples. Hardness in this report is the sum of dissolved calcium and magnesium in filtered water samples. Dissolved constituents are bioavailable and available to complex with other species in solution.

Gross-Alpha Radioactivity (GA)

None of the storm runoff samples were analyzed for dissolved GA radioactivity; GA analyses is typically performed on nonfiltered water samples.

Thirty-two of the 44 total GA results were detects, and the activity range was from 2.82 pCi/L to 71 pCi/L. The second largest GA value of 50.9 pCi/L was removed as suspect after it was found to have the largest calculated suspended GA activity. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL is 32.5 pCi/L, which is within the total GA baseline range.

Iron (Fe)

Eighteen of the 21 dissolved Fe results were detects, and the concentration range was from 32.5 µg/L to 2410 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL is 2150 µg/L, which is within the dissolved Fe baseline range.

All 21 total Fe results were detects, and the concentration range was from 148 µg/L to 20,700 µg/L. These data appear to originate from a gamma statistical distribution. The UTL is 22,500 µg/L, which is 1.09 times the maximum total Fe baseline concentration.

Lead (Pb)

Twenty of the 53 dissolved Pb results were detects, and the concentration range is 0.51 µg/L to 7.1 µg/L. These data do not follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The UTL value is 3.3 µg/L, which is within the dissolved Pb baseline range.

Forty-nine of the 51 total Pb results were detects, and the concentration range was from 0.57 µg/L to 234 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL is 133 µg/L, which is within the total Pb baseline range.

Magnesium (Mg)

All 53 dissolved Mg results were detects, and the concentration range is 0.181 mg/L to 5.73 mg/L. These data appear to originate from a lognormal statistical distribution. The UTL value is 3.85 mg/L, which is within the dissolved Mg baseline range.

All 51 total Mg results were detects, and the concentration range was from 0.359 mg/L to 7.71 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 6.33 mg/L, which is within the total Mg baseline range.

Manganese (Mn)

Eighteen of the 19 dissolved Mn results were detects, and the concentration range was from 2.5 µg/L to 625 µg/L. These data appear to originate from a lognormal statistical distribution. The UTL value is 625 µg/L, which is equal to the maximum dissolved Mn baseline concentration.

All 19 total Mn results were detects, and the concentration range was from 20.7 µg/L to 900 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 1500 µg/L, which is 1.67 times the maximum total Mn baseline concentration.

Nickel (Ni)

All 51 dissolved Ni results were detects, and the concentration range was from 0.59 µg/L to 9.13 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 7.57 µg/L, which is within the dissolved Ni baseline range.

All 49 total Ni results were detects, and the concentration range was from 1.1 µg/L to 33.9 µg/L. These data originate from a gamma statistical concentration range. The UTL value is 21.2 µg/L, which is within the total Ni baseline range

Nitrate (NO_3)

Twenty-two of the 25 dissolved NO_3 results were detects, and the concentration range was from 0.1 mg/L to 1.44 mg/L. These data appear to originate from a normal statistical distribution. The UTL value is 1.65 mg/L, which is 1.1 times the maximum dissolved NO_3 baseline concentration.

None of the nonfiltered storm water samples were analyzed for NO_3; NO_3 analyses are typically performed on filtered water samples.

Nitrite (NO_2)

Twenty-one of the 25 dissolved NO_2 results were detects, and the concentration range was from 0.565 mg/L to 0.346 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 0.66 mg/L, which is 1.9 times the maximum baseline concentration.

None of the storm runoff samples were analyzed for NO_2; NO_2 analyses are typically performed on filtered water samples.

Potassium (K)

All 51 dissolved K results were detects, and the concentration range was from 1.03 mg/L to 10.3 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 10.3 mg/L, which is equal to the maximum dissolved K baseline concentration.

All 49 total K results were detects, and the concentration range was from 1.39 mg/L to 14 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 13.2 mg/L, which is within the total K baseline range.

Radium-226+-228 (Ra-226 + -228)

None of the filtered urban runoff samples were analyzed for dissolved Ra-226+-228. Radium analyses are typically performed on nonfiltered water samples.

Nine of the 25 total Ra-226,+ -228 for urban runoff were detects, and the activity range was from 1.17 pCi/L to 15.5 pCi/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 8.94 pCi/L, which is within the total Ra-226,-228 baseline range.

Silver (Ag)

None of the 53 dissolved Ag results for urban runoff were detects, which is an insufficient number of detects to calculate a UTLs.

Seven of the 52 total Ag results for urban runoff were detects, and the concentration range was from 0.2 µg/L to 0.39 µg/L. These data do not follow a discernible statistical distribution at the 5% significance level; the UTL was calculated using nonparametric statistics. The UTL value is 0.263 µg/L, which is within the total Ag baseline range.

Sodium (Na)

All 51 dissolved Na results were detects, and the concentration range was from 0.92 mg/L to 101 mg/L. These data appear to originate from a lognormal statistical distribution. The larger concentrations likely reflect the effects of road salt at two locations that receive direct runoff from roads (see discussion of chloride above). The UTL value is 62.5 mg/L, which is within the dissolved Na baseline range.

All 49 total Na results were detects, and the concentration range was from 0.98 mg/L to 107 mg/L. These data appear to originate from a lognormal statistical distribution. The UTL value is 52.2 mg/L, which is within the total Na baseline range.

Sulfate (SO_4)

All 26 dissolved SO_4 results were detects, and the concentration range was from 1.52 mg/L to 12.9 mg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 13.8 mg/L, which is 1.07 times the maximum dissolved SO_4 baseline concentration.

None of the nonfiltered storm runoff samples were analyzed for SO_4; SO_4 analyses are typically performed on filtered water samples.

Uranium (U)

Six of the 20 dissolved U results were detects, which is an insufficient number of detects to calculate a UTL value.

Fifteen of the 19 total U results were detects, and the concentration range was from 0.06 µg/L to 1.9 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 1.73 µg/L, which is within the total U baseline range.

Vanadium (V)

Forty-one of the 47 dissolved V results were detects, and the concentration range was from 1.2 µg/L to 24.1 µg/L. These data contained multiple detection limits, and the UTL was calculated using the Kaplan-Meier nonparametric method. The UTL value is 10.6 µg/L, which is within the dissolved V baseline range.

Forty-five of the 46 total V results were detects, and the concentration range was from 1.25 µg/L to 41.4 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 32.2 µg/L, which is within the total V baseline range.

Zinc (Zn)

All 53 dissolved Zn results were detects, and the concentration range was from 7 µg/L to 882 µg/L. These data appear to originate from a lognormal statistical distribution. The UTL value is 1120 µg/L, which is 1.27 times the maximum dissolved Zn urban baseline concentration.

All 51 total Zn results were detects, and the concentration range was from 21.3 µg/L to 2290 µg/L. These data appear to originate from a gamma statistical distribution. The UTL value is 1671 µg/L, which is within the total Zn baseline range.

5.3 Suspended-Constituent Concentrations at Background Runoff Locations

Table 16 compares the suspended sediment UTLs for the two background storm water runoff areas to background UTLs previously established for Pajarito Plateau soils and canyon bed sediments. The UTLs for suspended sediments transported in runoff samples are commonly 3 times larger than the background soils and canyon sediment BVs. The differences are likely from the finer texture of suspended sediments in runoff versus the textures of native soils and deposited sediments (LANL 2012, 219767).

The abundance of silt+clay in Pajarito Plateau runoff samples is substantially higher than previously measured by McDonald et al. (2003, 076084) for stream channel and floodplain deposits on the plateau. The earlier study found that sediment deposited in the floor of the stream channels consisted of approximately 20% silt+clay on average, while the suspended sediment samples collected in this study contained approximately 90% of silt+clay on average. Therefore, it is inferred that stream power in the present runoff events was not sufficient to mobilize most of the particles heavier than silt from the stream bed, and fine-grained sediment was most prevalent in runoff. The suspended sediment was approximately 3 to 5 times more abundant in the silt and clay fractions than previously found in the stream bed. The tendency towards finer particles is important because the concentrations of most analytes increase as the silt and clay content increase, given the higher surface area to volume ratios as particle sizes decrease and surface sorption is the driving force.

Table 16
Suspended Sediments UTL in Background Runoff Storm Water Compared with Background Soils and Canyon Sediments BV

Analyte	Units	Background Suspended Sediments in This Study		Previous Background Studies		
		Reference Area UTL: 95,95	Western Boundary UTL: 95,95	Soil UTL: 95,95[a]	Canyons Sediment UTL: 95,95[b]	Regional River Sediments: 95,95[c]
Aluminum	mg/kg	29,000	53,030	29,200	15,400	—[d]
Arsenic	mg/kg	5.51	—	8.17	3.98	—
Barium	mg/kg	934	564	295	127	—
Beryllium	mg/kg	17.3	2.69	1.83	1.31	—
Cadmium	mg/kg	1.55	0.982	0.4[d]	0.4[e]	—
Calcium	mg/kg	50,500	98,400	6120	4420	—
Chromium	mg/kg	17.2	53.2	19.3	10.5	—
Cobalt	mg/kg	35.2	17.6	8.64	4.73	—
Copper	mg/kg	21.2	147	14.7	11.2	—
Gross Alpha	pCi/g	184	82.1	—	58.8	15.7
Iron	mg/kg	31,700	40,100	21,500	13,800	—
Lead	mg/kg	67.4	91.7	22.3	19.7	—
Magnesium	mg/kg	9310	16400	4610	2370	—
Manganese	mg/kg	4210	1520	671	543	—
Nickel	mg/kg	42.8	32.1	15.4	9.38	—
Sodium	mg/kg	3520	192,000	915	1470	—
Uranium	mg/kg	3.31	2.99	1.8	2.22	—
Vanadium	mg/kg	50.5	82	39.6	19.7	—
Zinc	mg/kg	162	803	48.8	60.2	—

a Longmire et al. (1996, 055115).
b McDonald et al. (2003, 076084).
c McLin and Lyons (2002, 082305).
d = Values not included in the report
e These values are detection limits not UTLs.

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Appendix A

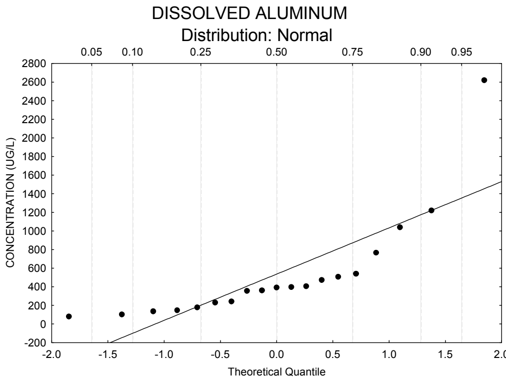
Probability Plots

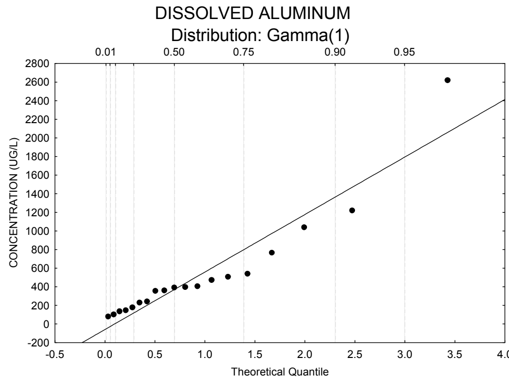
This appendix contains probability plots for metals and radioactivity concentrations on three scales: (1) untransformed (normal distribution), (2) gamma transformation, and (3) natural logarithmic transformation.

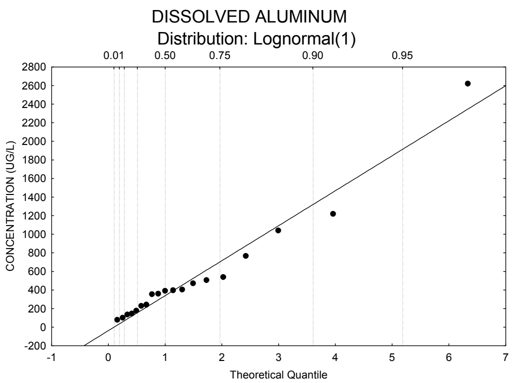
The probability plots show each analytical result ordered from lowest to highest. The x-axis is the standard normal quantile scale. The units of the standard normal quantile are in standard deviation, where 1 represents 1 standard deviation. The y-axis of the probability plot is the concentration in µg/L, mg/L, or pCi/L. The purpose of the plots is twofold. First, they are a succinct way to present all data for each analyte at a specific location. Second, they provide a way to assess the statistical distribution of each group of results. Specifically, if the data follow a straight line when plotted on an untransformed or standard normal scale, these data are considered to originate from a normal distribution. One can assess the fit to other statistical distributions by transforming the y-axis to another scale. For example, chemicals in the environment frequently follow a lognormal distribution, and transforming the y-axis into a logarithmic scale assesses the fit to a lognormal distribution.

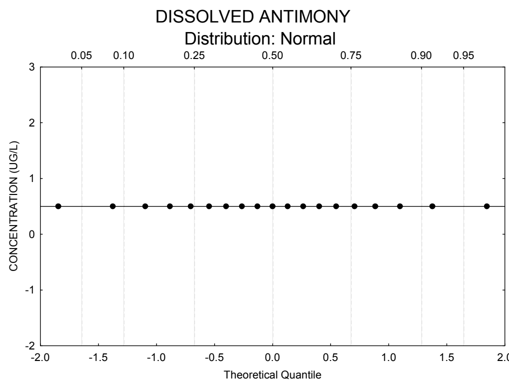
Generally, probability plots of background concentration data for soils, sediments, and dissolved constituents plot on a line after some form of transformation, indicating environmental levels of many constituents vary within a limited statistical range. Outliers or anomalous results are often identified by their deviation from the line. However, for total concentrations in storm water, it is not clear if this approach works to identify outliers because storm water total variations are controlled more by the carrying capacity and energy of the flow event rather than by actual variation in the concentrations. Consequently, to identify possible outlier or anomalous results, the calculated suspended concentrations were analyzed because they generally vary within a relatively limited range unless contamination is present.

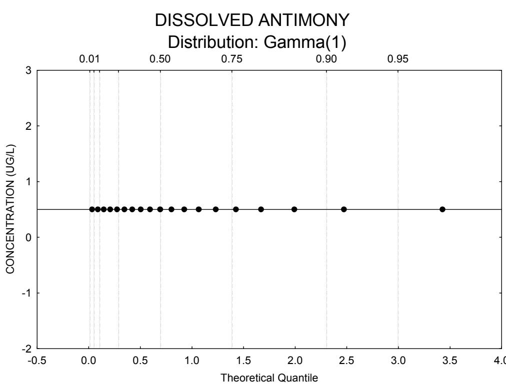
Reference Area

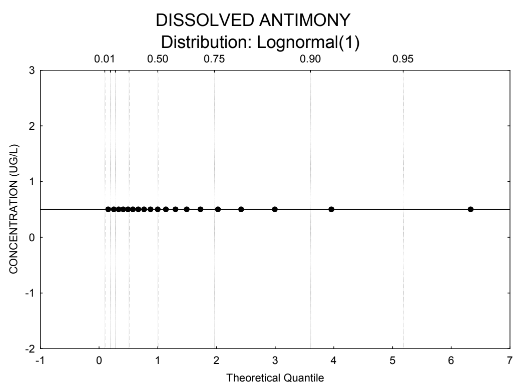


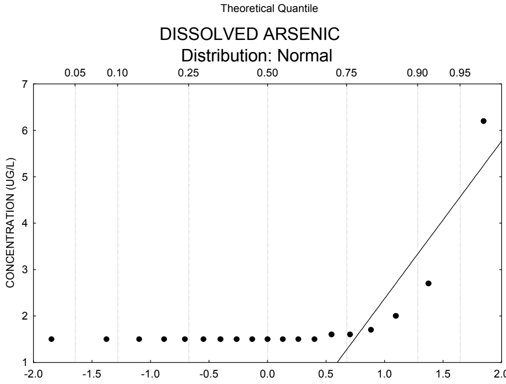


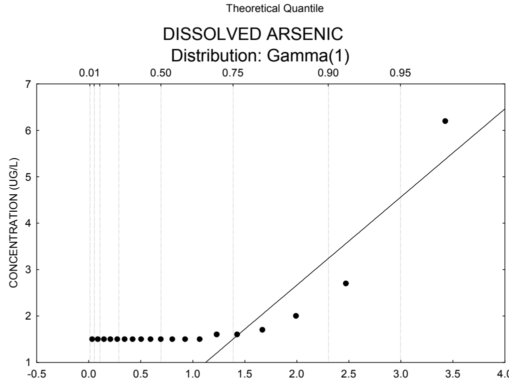












DISSOLVED ARSENIC
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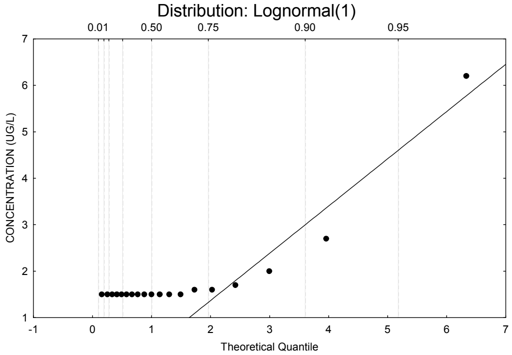
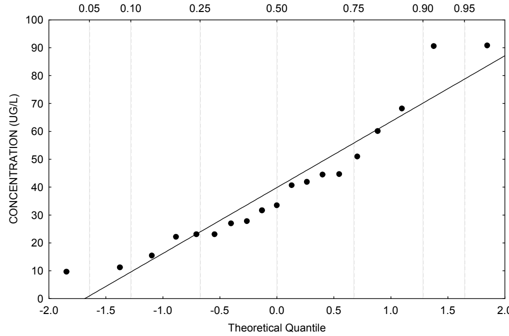


DISSOLVED BARIUM
Distribution: Normal



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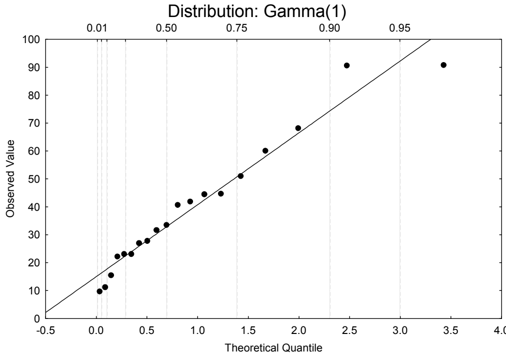
Distribution: Gamma(1)



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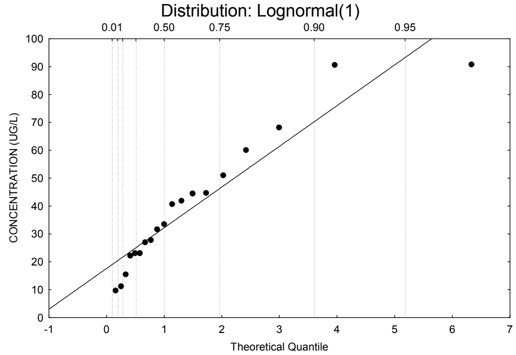

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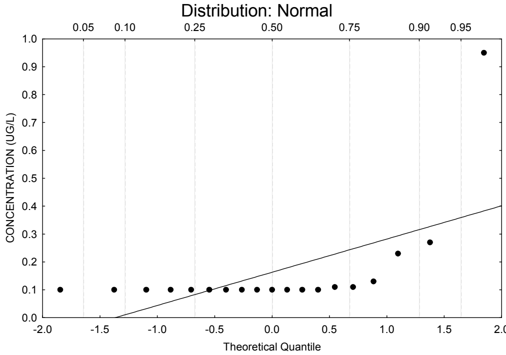
Distribution: Normal



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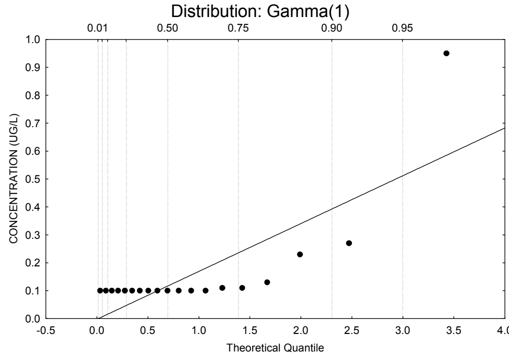

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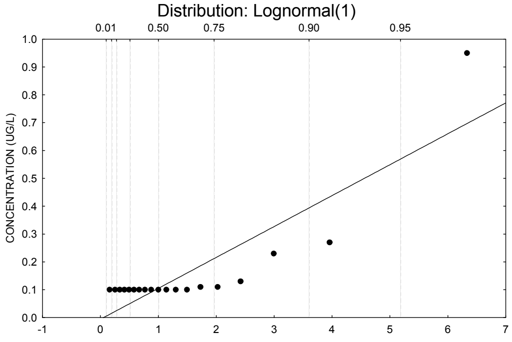

DISSOLVED BORON
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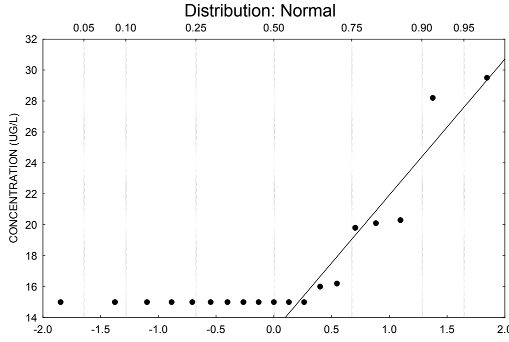

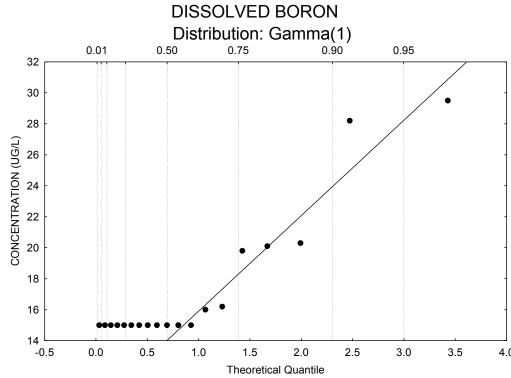
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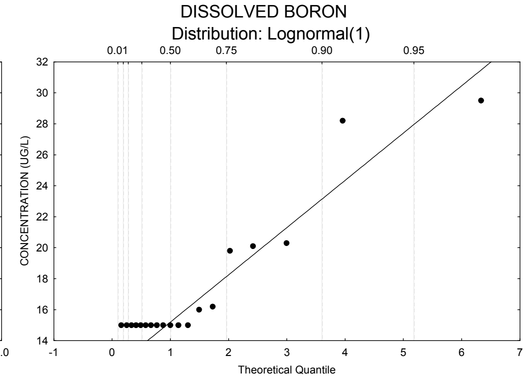
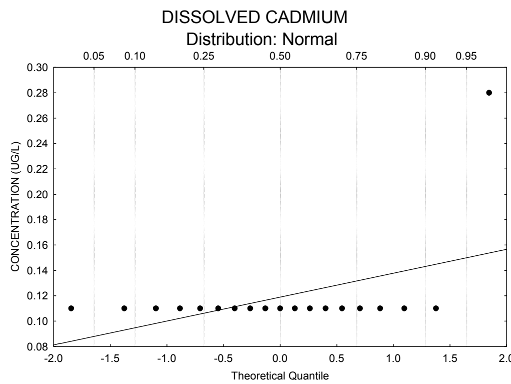
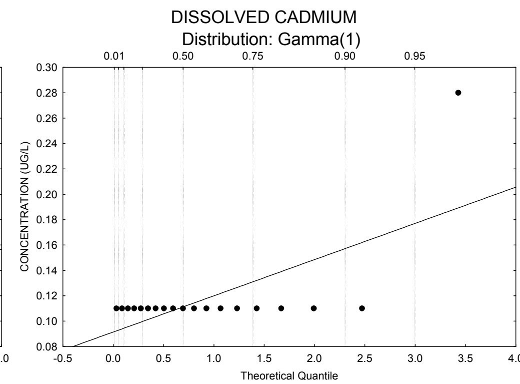
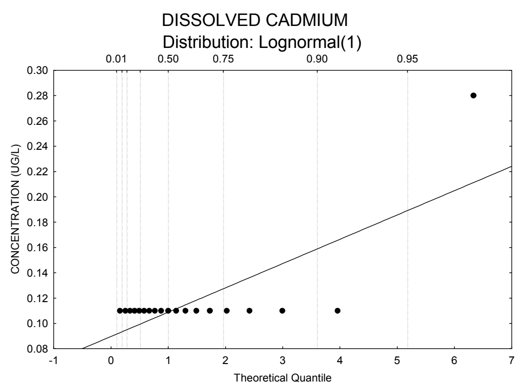
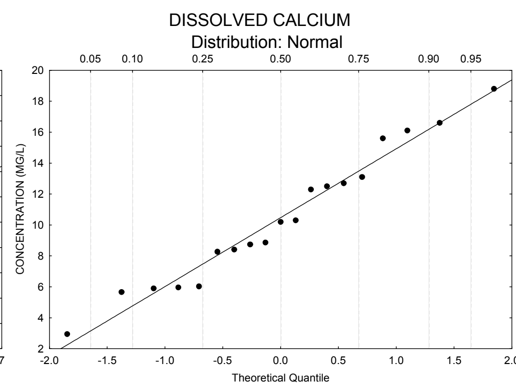
CONCENTRATION (UG/L)
Theoretical Quantile

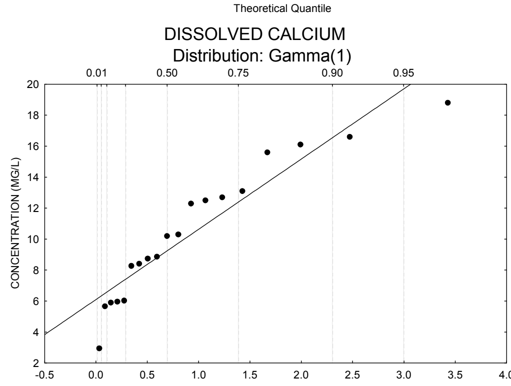

DISSOLVED BORON
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

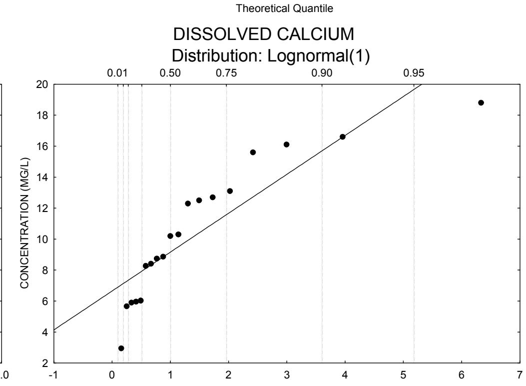

DISSOLVED CADMIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

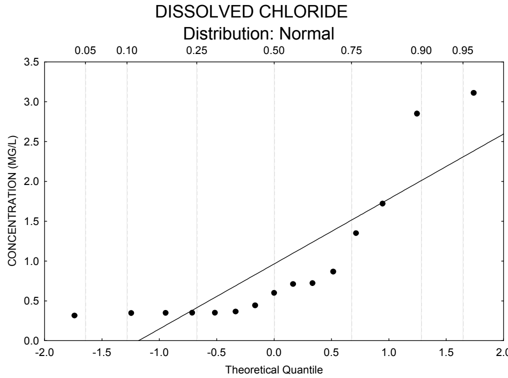

DISSOLVED CADMIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

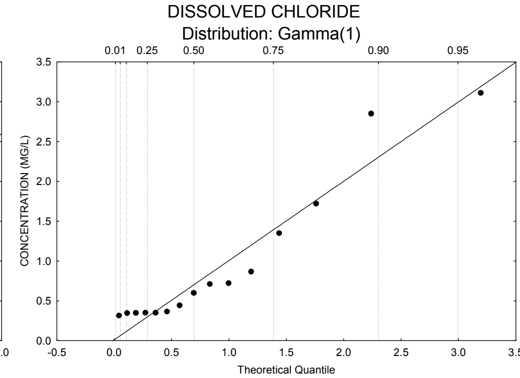

DISSOLVED CADMIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

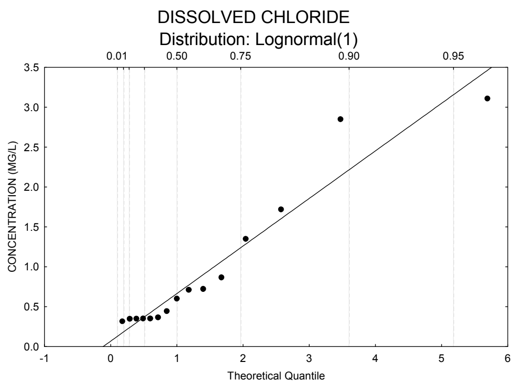

DISSOLVED CALCIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

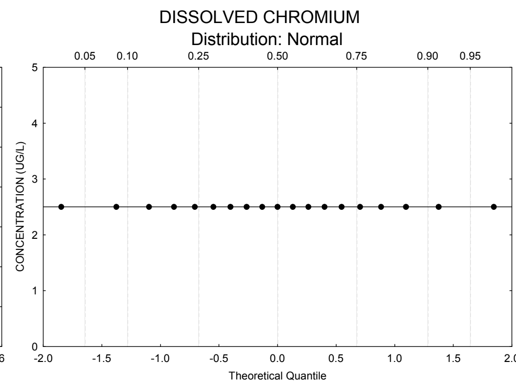

DISSOLVED CALCIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

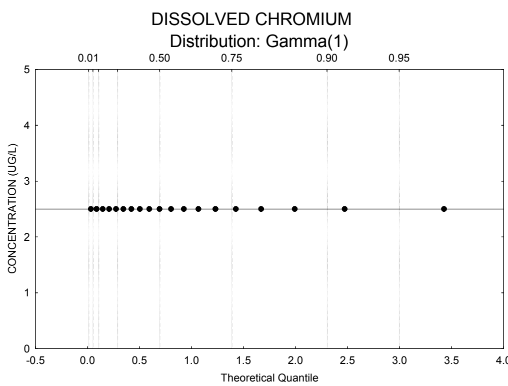

DISSOLVED CALCIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

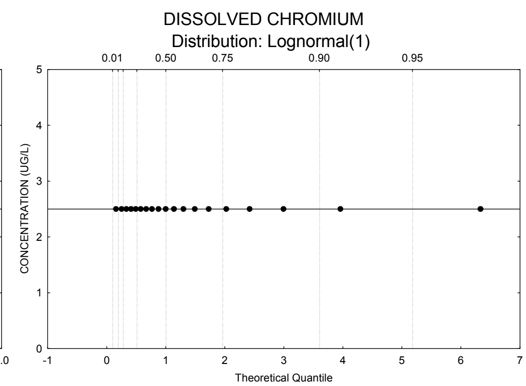

DISSOLVED CHLORIDE
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

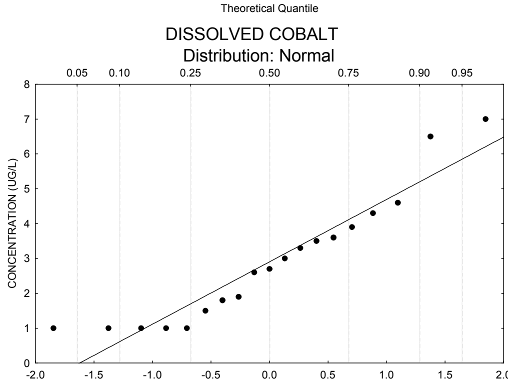

DISSOLVED CHLORIDE
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

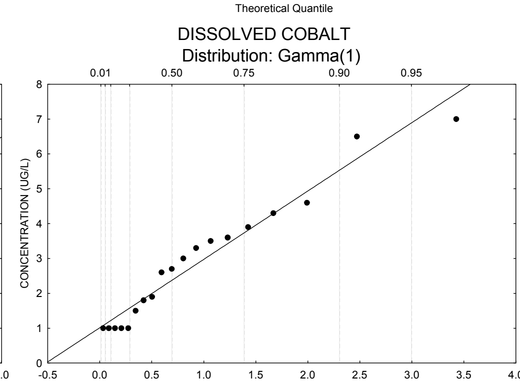

DISSOLVED CHLORIDE
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

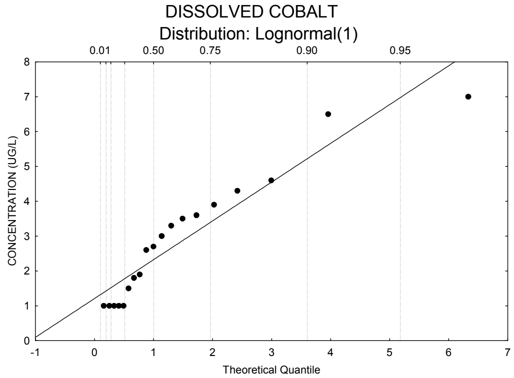

DISSOLVED CHROMIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

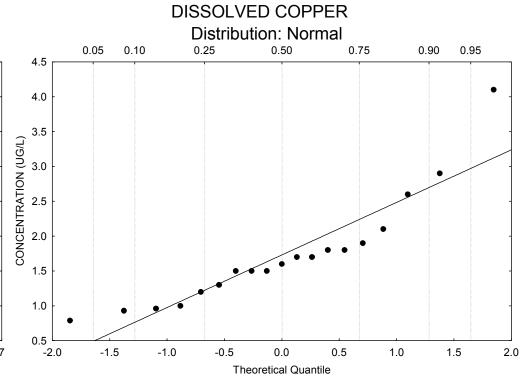

DISSOLVED CHROMIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

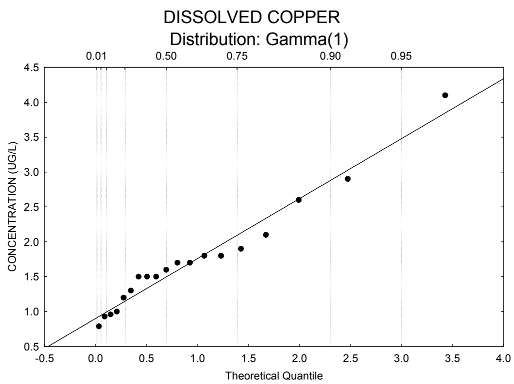

DISSOLVED CHROMIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

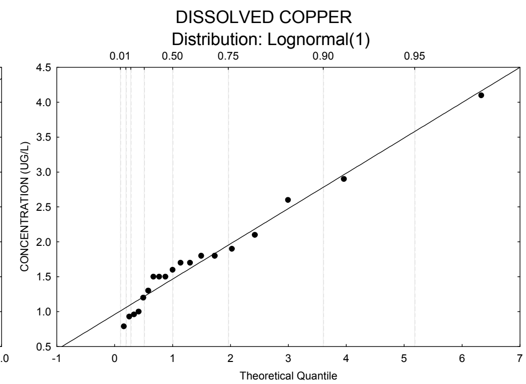

DISSOLVED COBALT
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

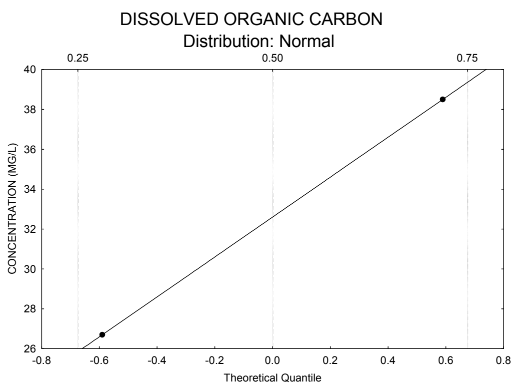

DISSOLVED COBALT
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

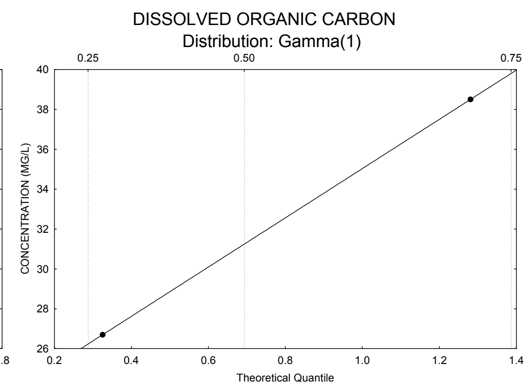

DISSOLVED COBALT
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

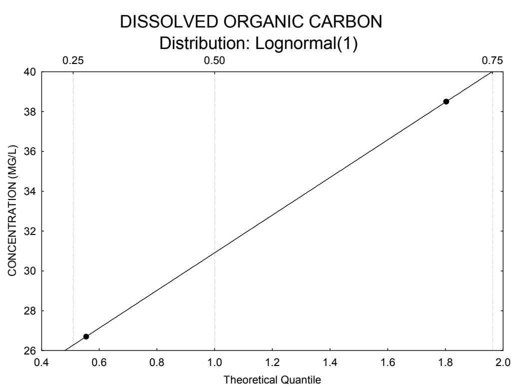

DISSOLVED COPPER
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

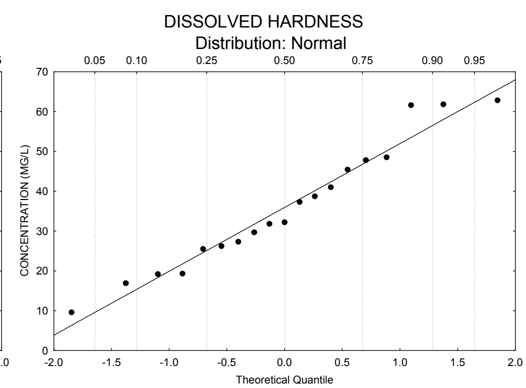

DISSOLVED COPPER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

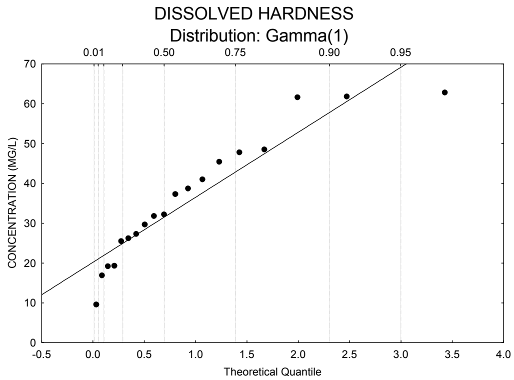

DISSOLVED COPPER
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

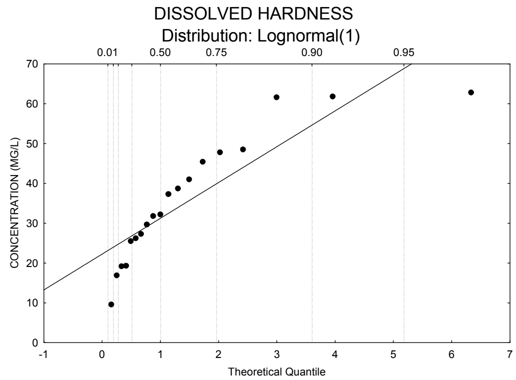

DISSOLVED ORGANIC CARBON
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

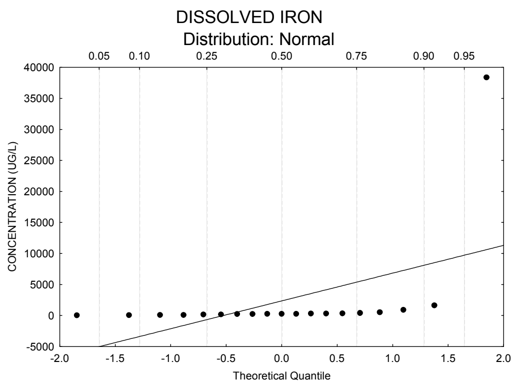

DISSOLVED ORGANIC CARBON
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

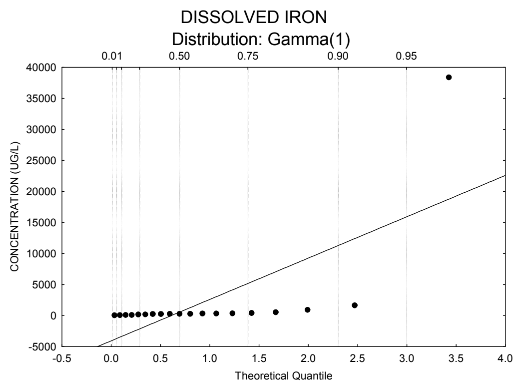

DISSOLVED ORGANIC CARBON
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

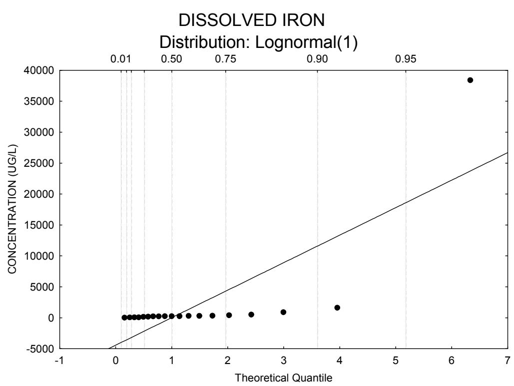

DISSOLVED HARDNESS
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

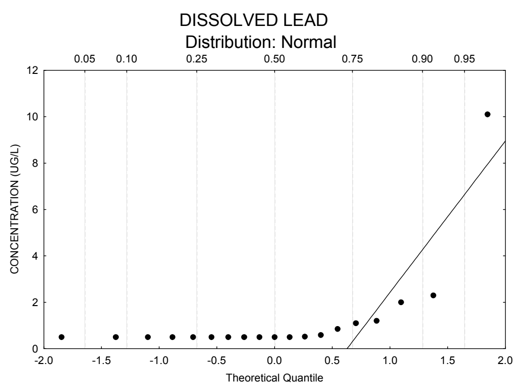

DISSOLVED HARDNESS
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

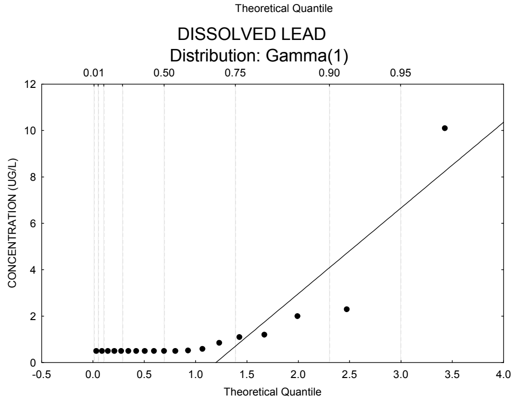

DISSOLVED HARDNESS
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

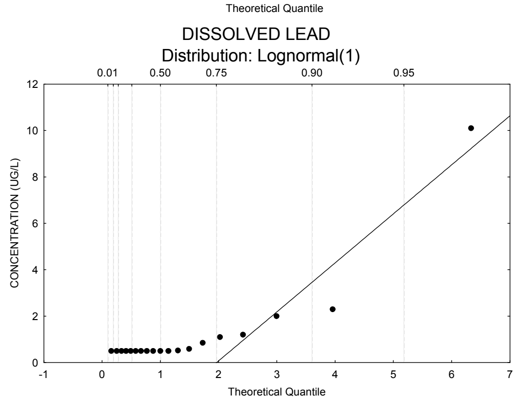

DISSOLVED IRON
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

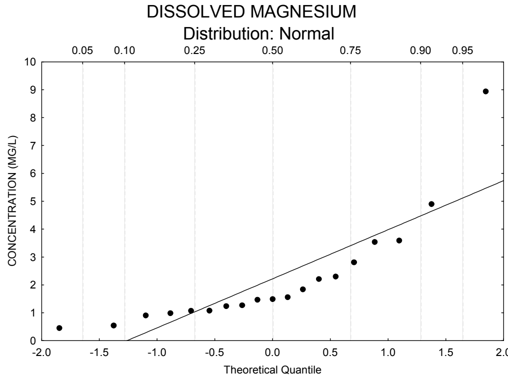

DISSOLVED IRON
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

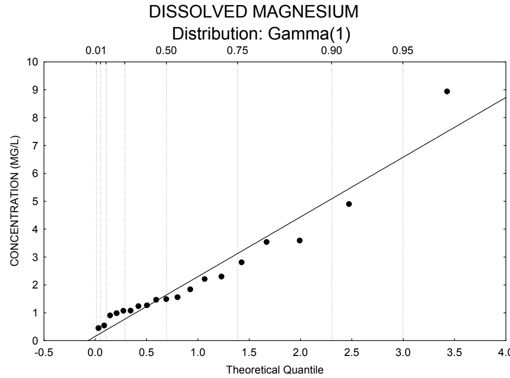

DISSOLVED IRON
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

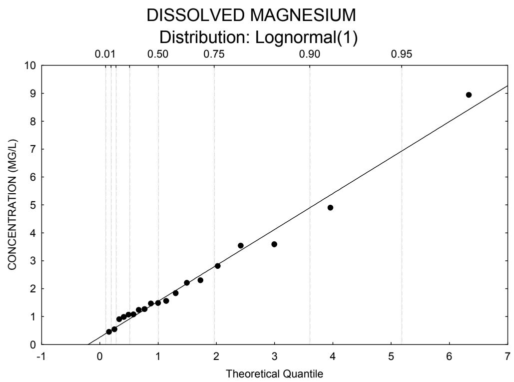

DISSOLVED LEAD
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

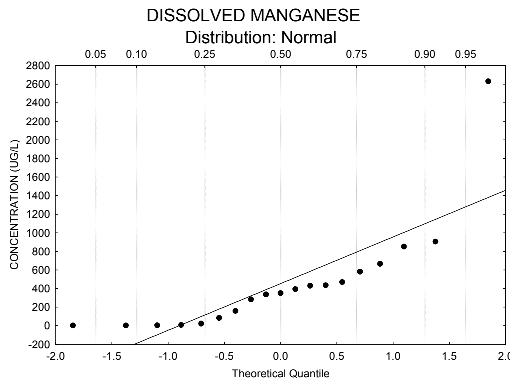

DISSOLVED LEAD
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

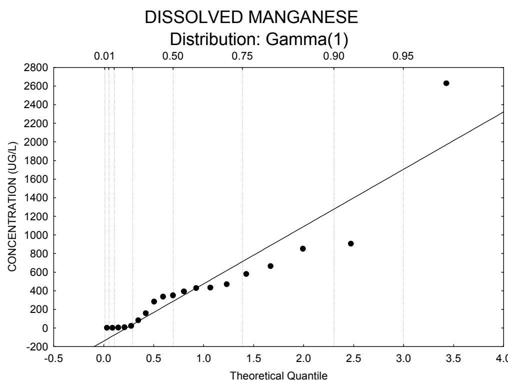

DISSOLVED LEAD
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

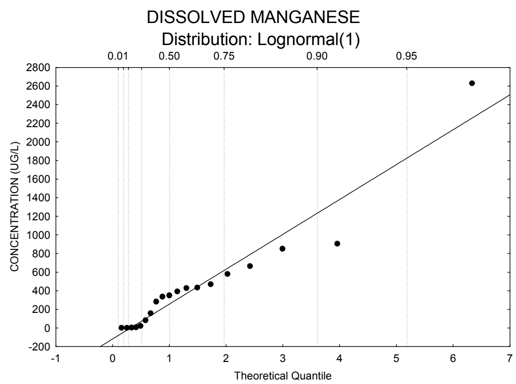

DISSOLVED MAGNESIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

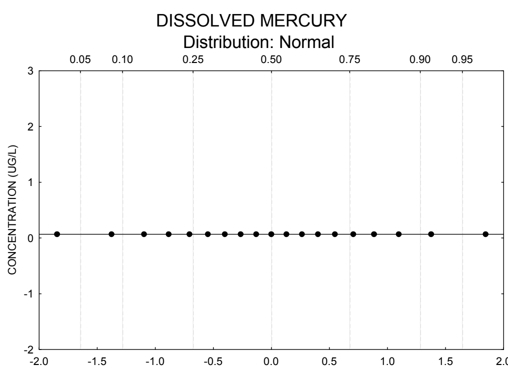

DISSOLVED MAGNESIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

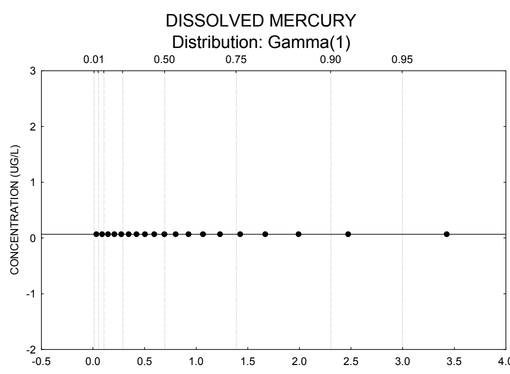

DISSOLVED MAGNESIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile


DISSOLVED MANGANESE
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

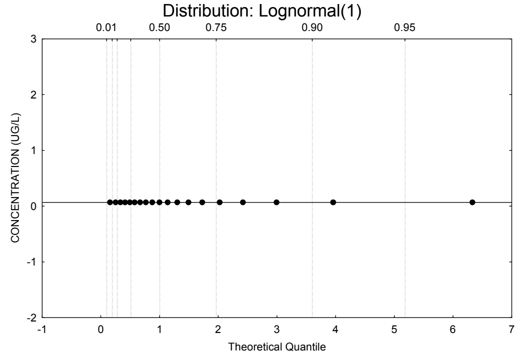

DISSOLVED MANGANESE
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile


DISSOLVED MANGANESE
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

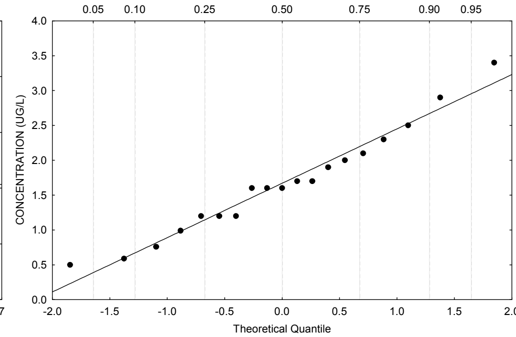

DISSOLVED MERCURY
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile


DISSOLVED MERCURY
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

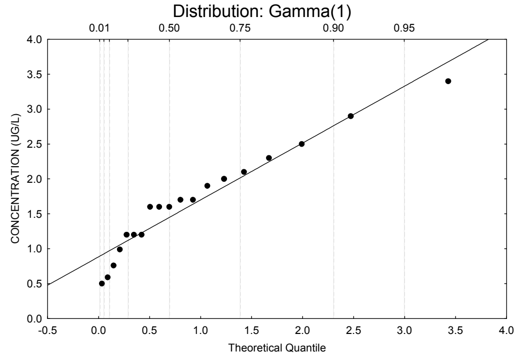
DISSOLVED MERCURY
Distribution: Lognormal(1)



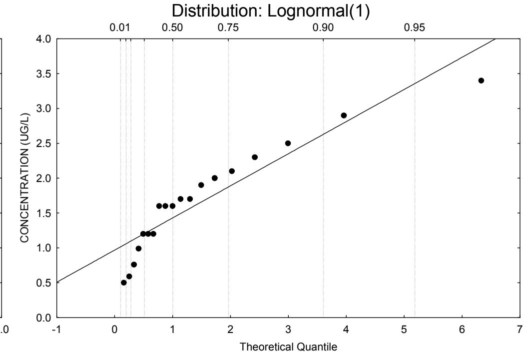
DISSOLVED NICKEL
Distribution: Normal



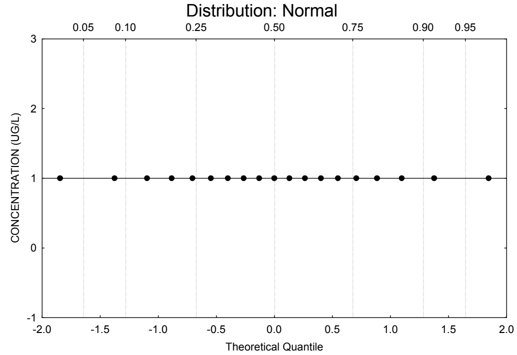
DISSOLVED NICKEL
Distribution: Gamma(1)



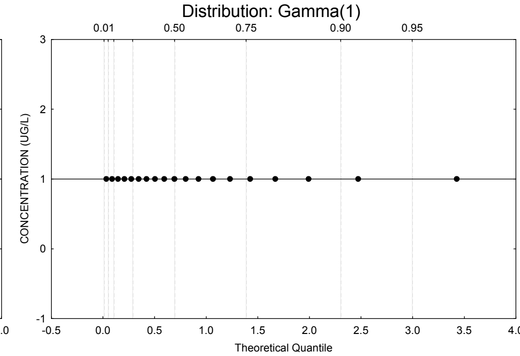
DISSOLVED NICKEL
Distribution: Lognormal(1)



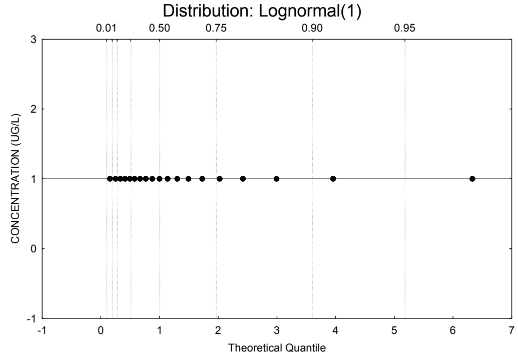
DISSOLVED SELENIUM
Distribution: Normal



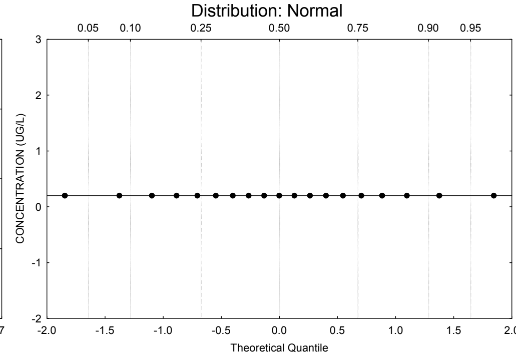
DISSOLVED SELENIUM
Distribution: Gamma(1)

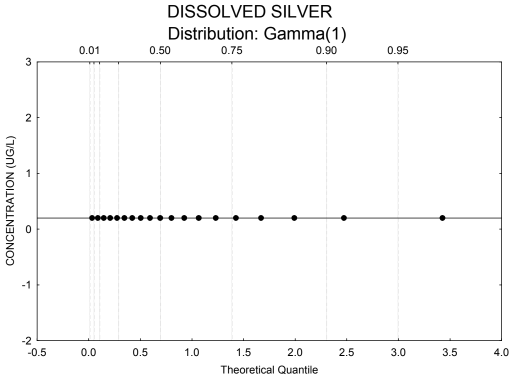


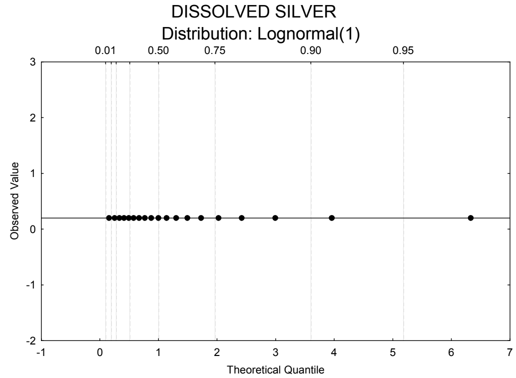
DISSOLVED SELENIUM
Distribution: Lognormal(1)

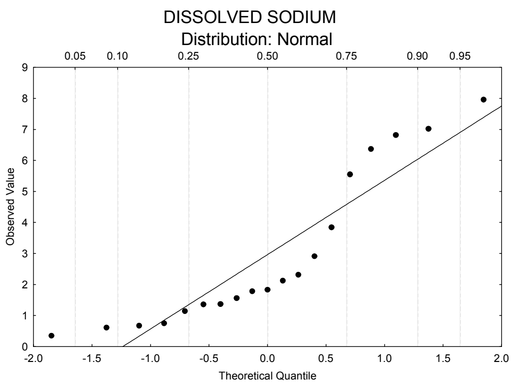


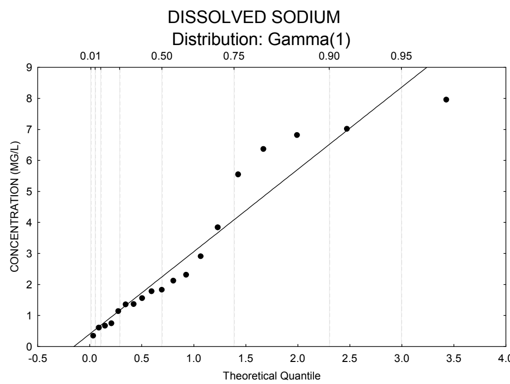
DISSOLVED SILVER
Distribution: Normal

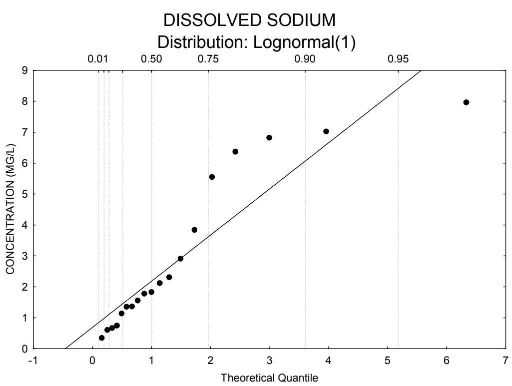


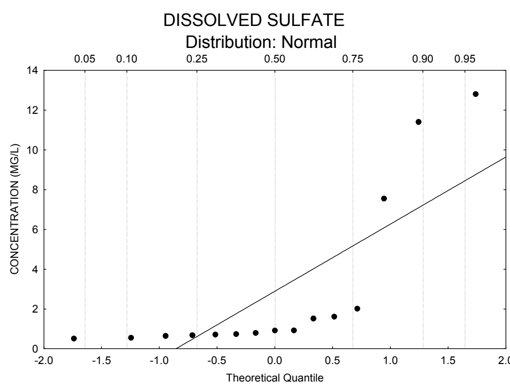

DISSOLVED SILVER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

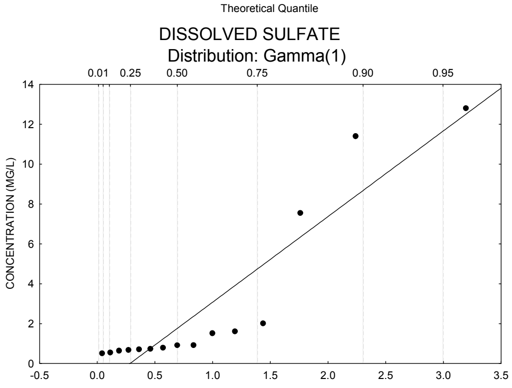

DISSOLVED SILVER
Distribution: Lognormal(1)
Observed Value
Theoretical Quantile

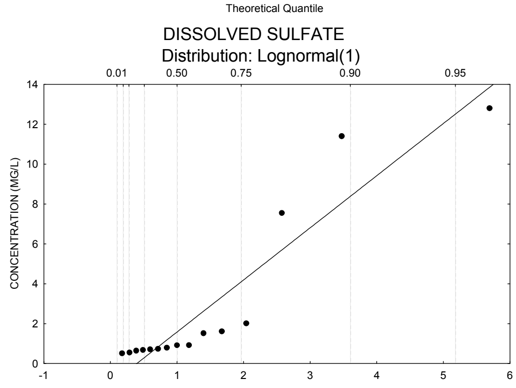

DISSOLVED SODIUM
Distribution: Normal
Observed Value
Theoretical Quantile

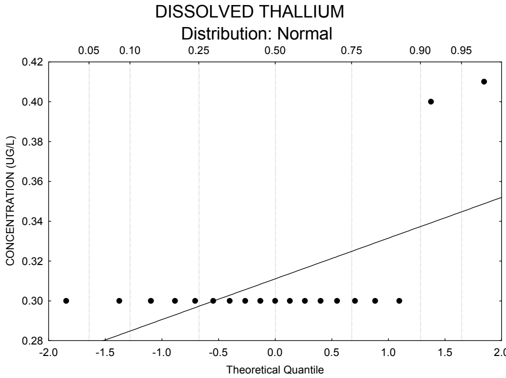

DISSOLVED SODIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

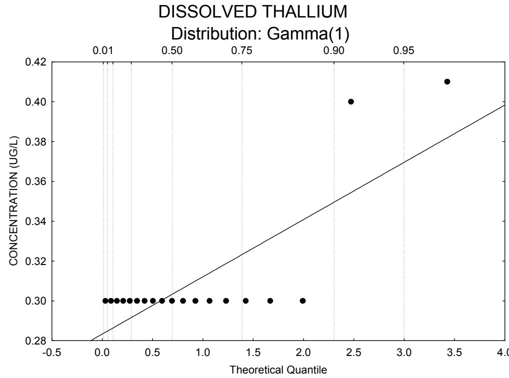

DISSOLVED SODIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

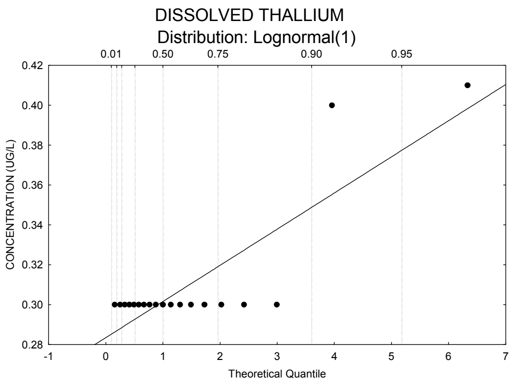

DISSOLVED SULFATE
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

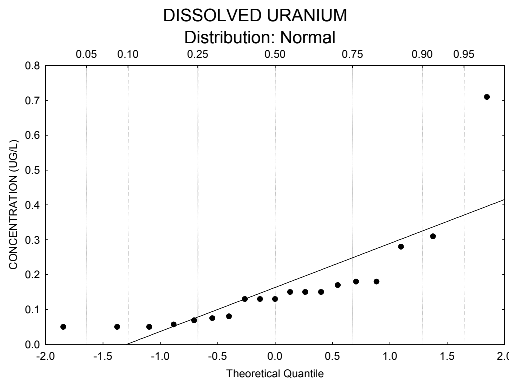

DISSOLVED SULFATE
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

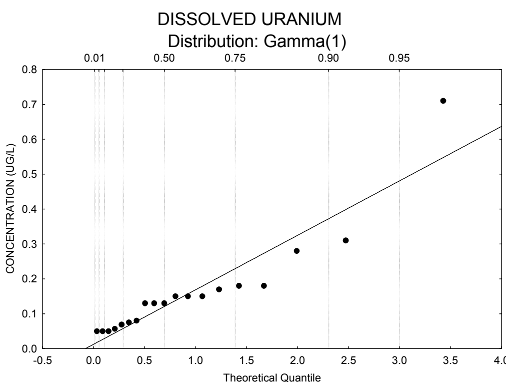

DISSOLVED SULFATE
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

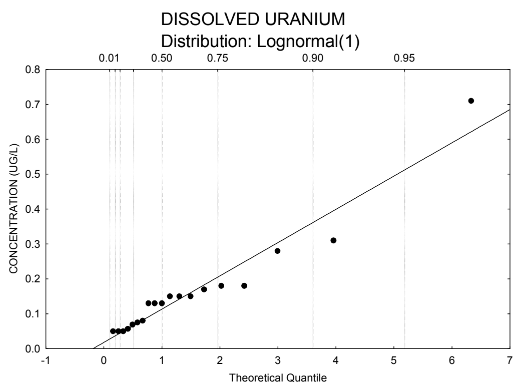

DISSOLVED THALLIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

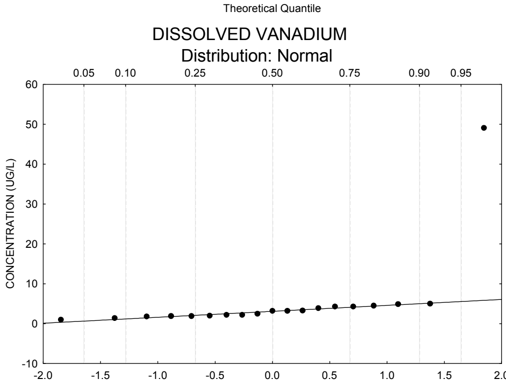

DISSOLVED THALLIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

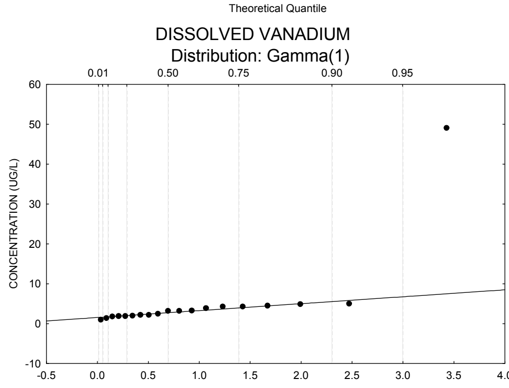

DISSOLVED THALLIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

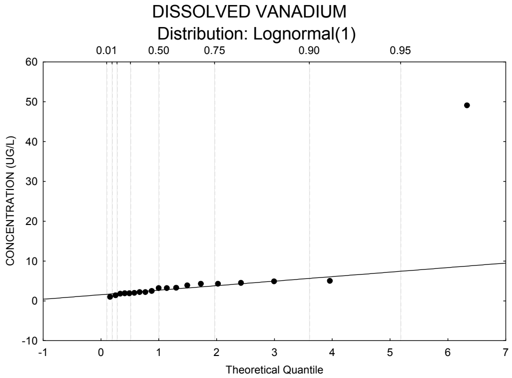

DISSOLVED URANIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

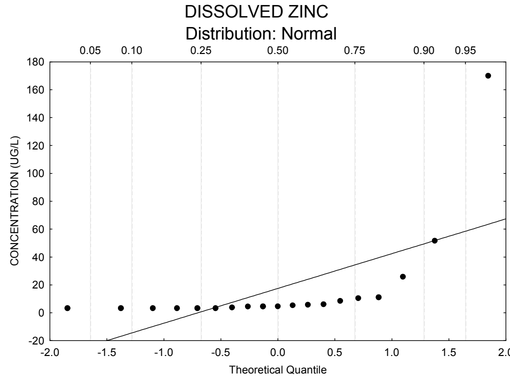

DISSOLVED URANIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

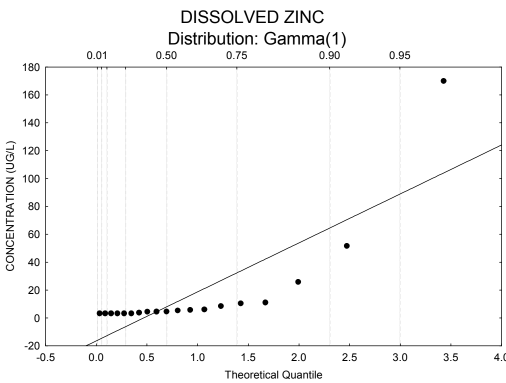

DISSOLVED URANIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

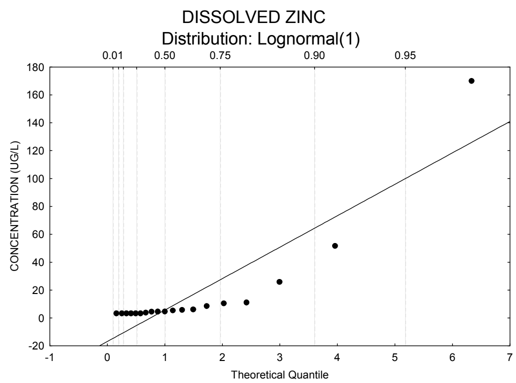

DISSOLVED VANADIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

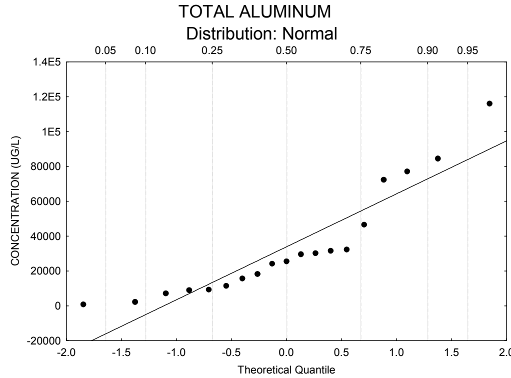

DISSOLVED VANADIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

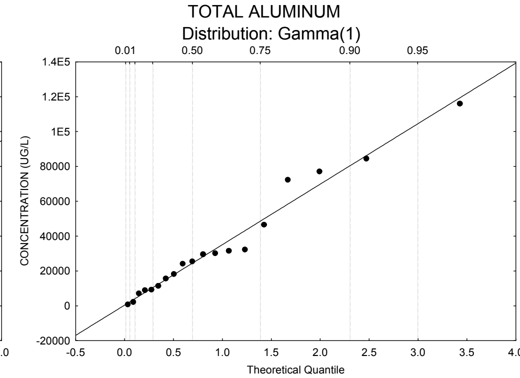

DISSOLVED VANADIUM
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

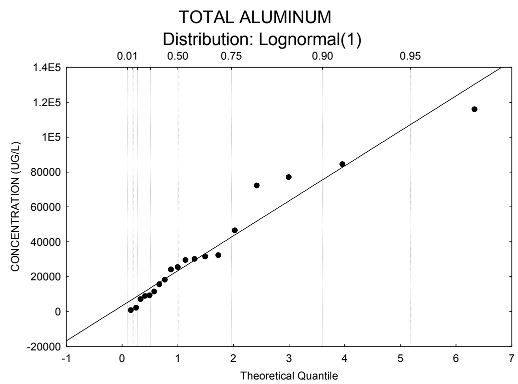

DISSOLVED ZINC
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

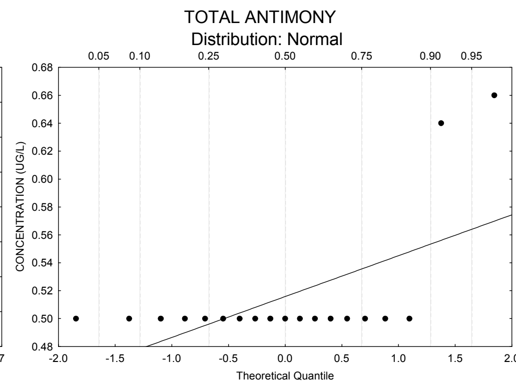

DISSOLVED ZINC
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

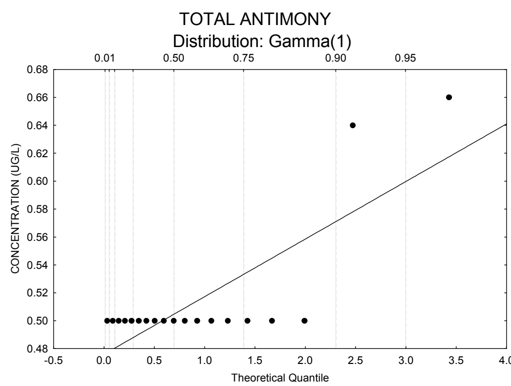

DISSOLVED ZINC
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

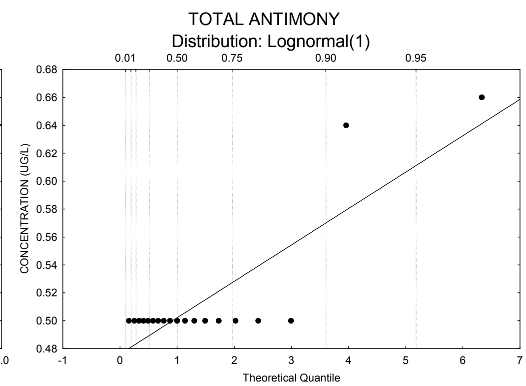

TOTAL ALUMINUM
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
1.4E5 1.2E5 1E5 80000 60000 40000 20000 0 -20000
-2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0
Theoretical Quantile

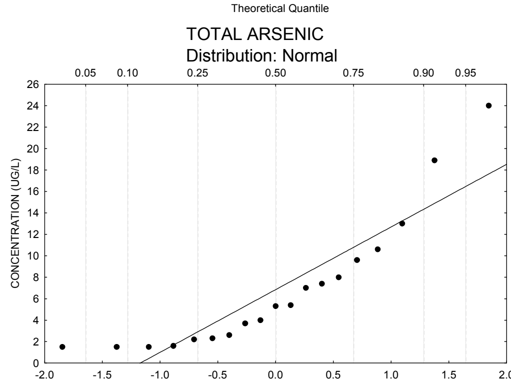

TOTAL ALUMINUM
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
1.4E5 1.2E5 1E5 80000 60000 40000 20000 0 -20000
-0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
Theoretical Quantile

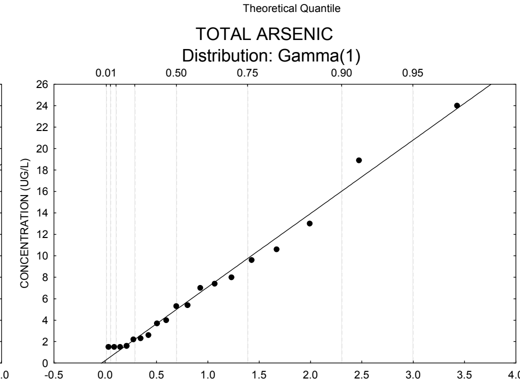

TOTAL ALUMINUM
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
1.4E5 1.2E5 1E5 80000 60000 40000 20000 0 -20000
-1 0 1 2 3 4 5 6 7
Theoretical Quantile


TOTAL ANTIMONY
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
0.68 0.66 0.64 0.62 0.60 0.58 0.56 0.54 0.52 0.50 0.48
-2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0
Theoretical Quantile

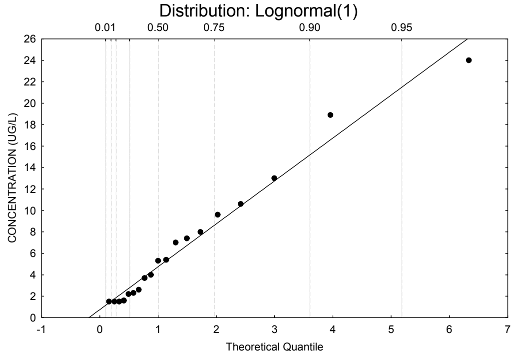

TOTAL ANTIMONY
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
0.68 0.66 0.64 0.62 0.60 0.58 0.56 0.54 0.52 0.50 0.48
-0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
Theoretical Quantile


TOTAL ANTIMONY
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
0.68 0.66 0.64 0.62 0.60 0.58 0.56 0.54 0.52 0.50 0.48
-1 0 1 2 3 4 5 6 7
Theoretical Quantile

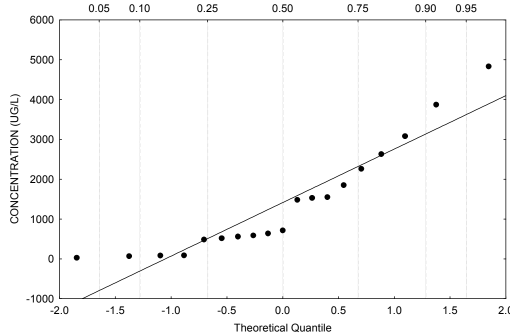

TOTAL ARSENIC
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
26 24 22 20 18 16 14 12 10 8 6 4 2 0
-2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0
Theoretical Quantile


TOTAL ARSENIC
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
26 24 22 20 18 16 14 12 10 8 6 4 2 0
-0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
Theoretical Quantile

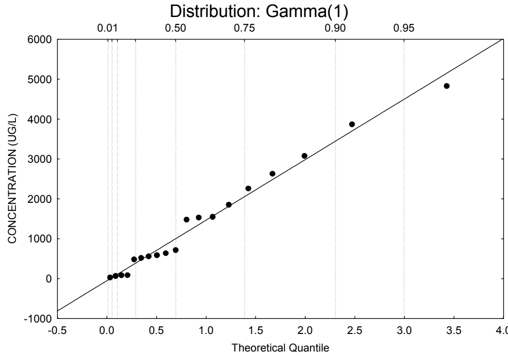
TOTAL ARSENIC
Distribution: Lognormal(1)



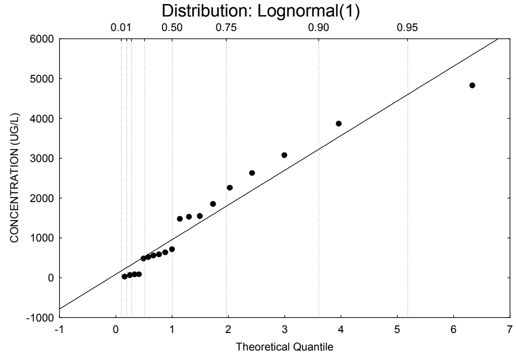
TOTAL BARIUM
Distribution: Normal



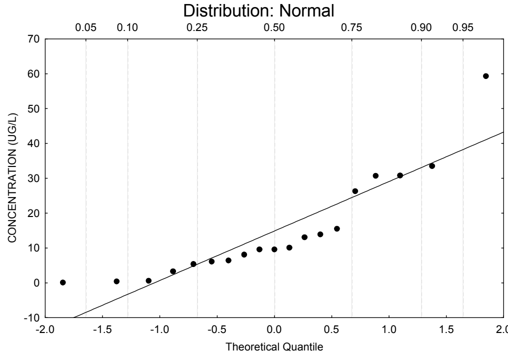
TOTAL BARIUM
Distribution: Gamma(1)



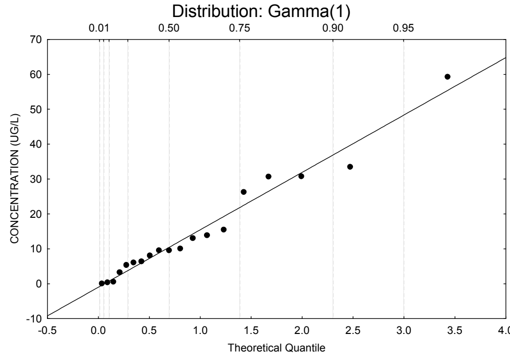
TOTAL BARIUM
Distribution: Lognormal(1)



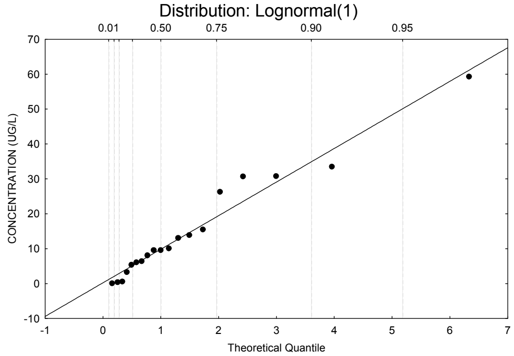
TOTAL BERYLLIUM
Distribution: Normal



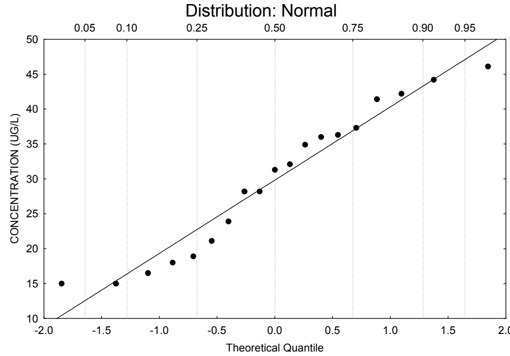
TOTAL BERYLLIUM
Distribution: Gamma(1)



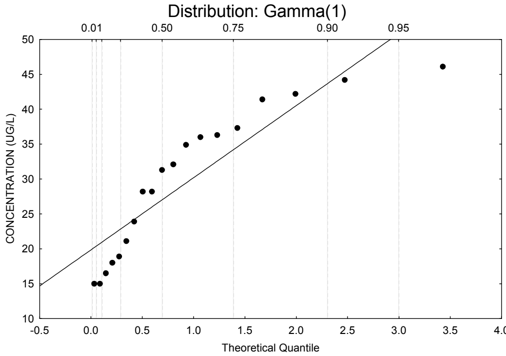
TOTAL BERYLLIUM
Distribution: Lognormal(1)



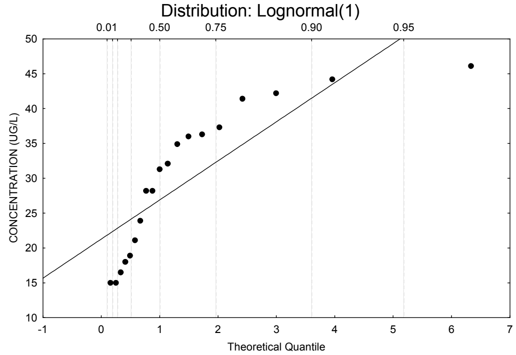
TOTAL BORON
Distribution: Normal



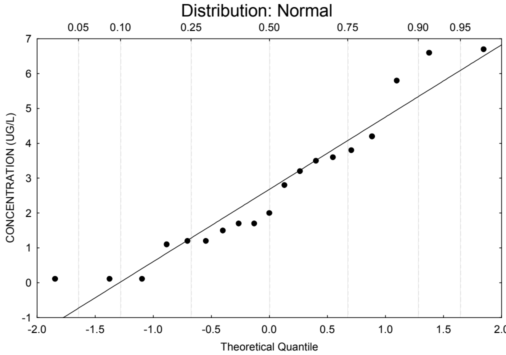
TOTAL BORON
Distribution: Gamma(1)



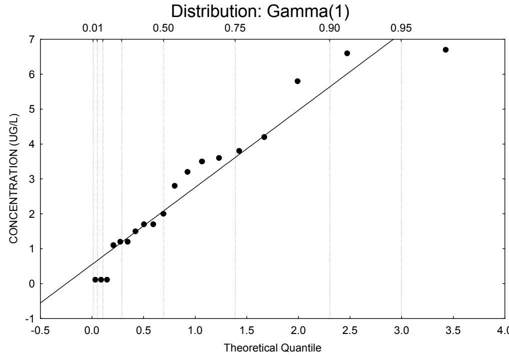
TOTAL BORON
Distribution: Lognormal(1)



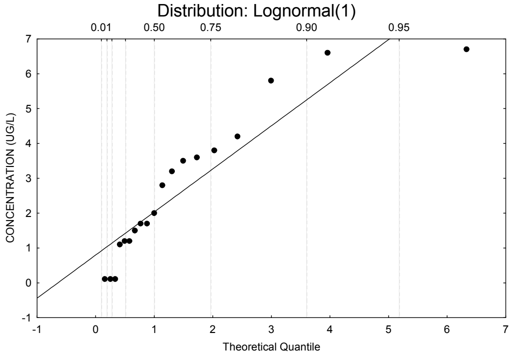
TOTAL CADMIUM
Distribution: Normal



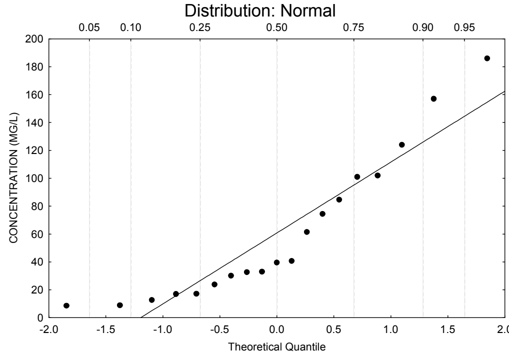
TOTAL CADMIUM
Distribution: Gamma(1)



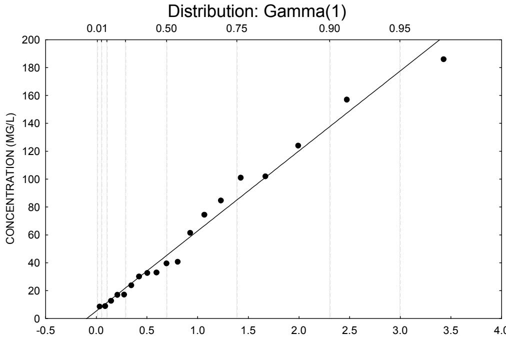
TOTAL CADMIUM
Distribution: Lognormal(1)



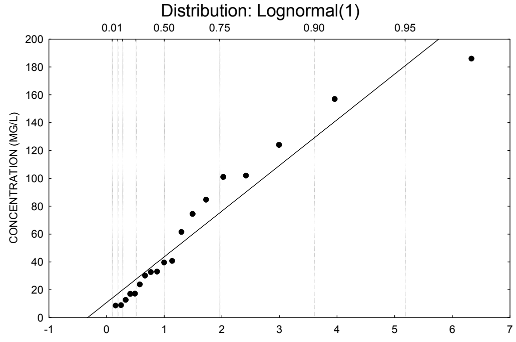
TOTAL CALCIUM
Distribution: Normal

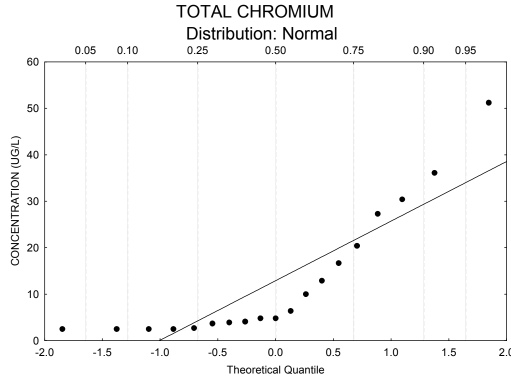


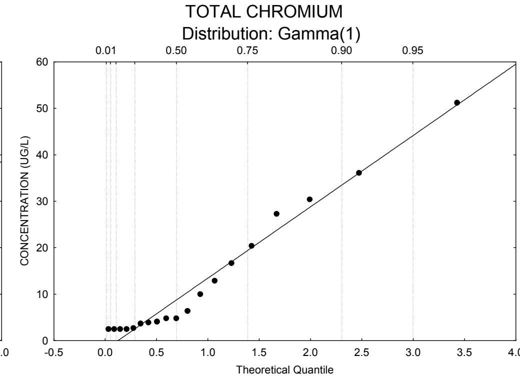
TOTAL CALCIUM
Distribution: Gamma(1)

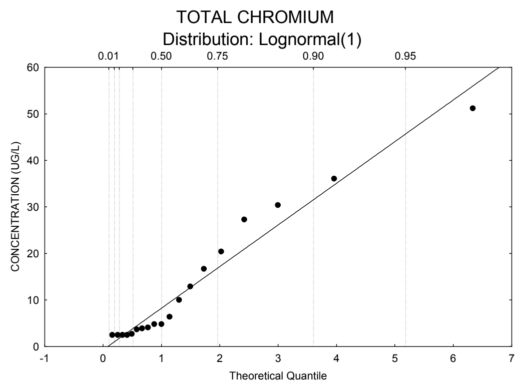


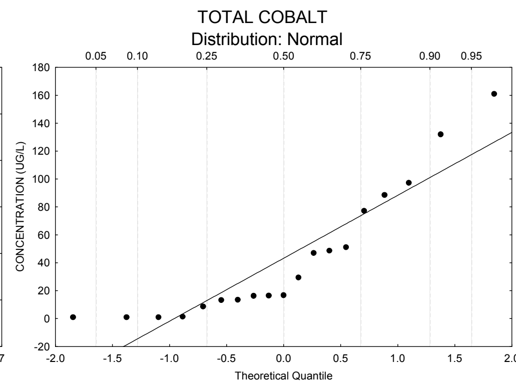
TOTAL CALCIUM
Distribution: Lognormal(1)

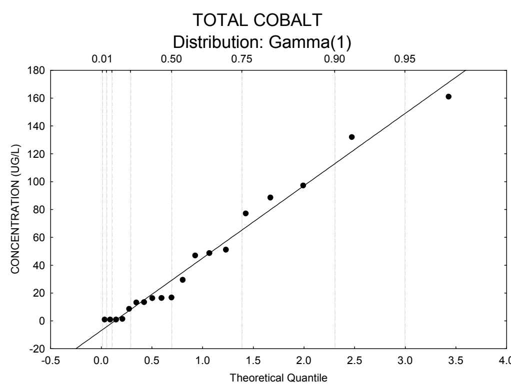


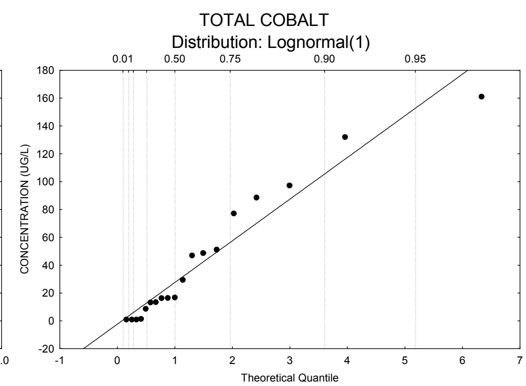

TOTAL CHROMIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

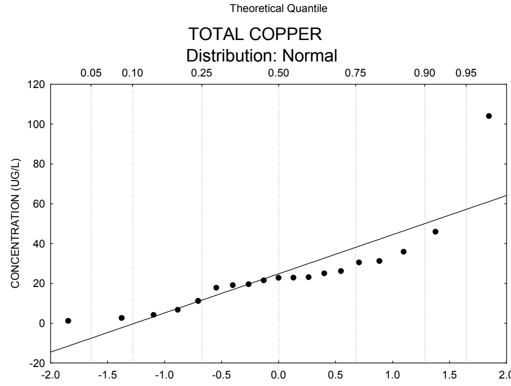

TOTAL CHROMIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

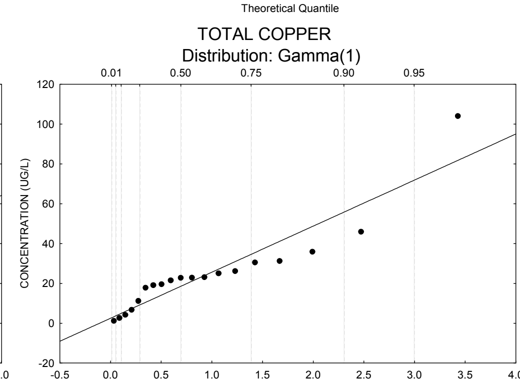

TOTAL CHROMIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL COBALT
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

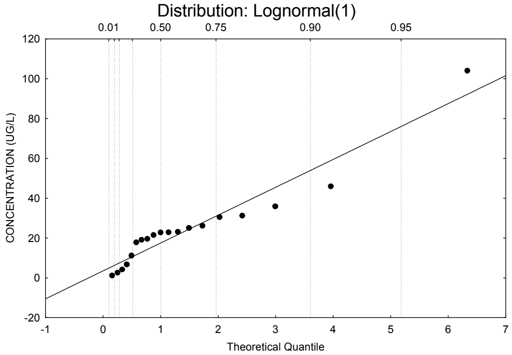

TOTAL COBALT
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL COBALT
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

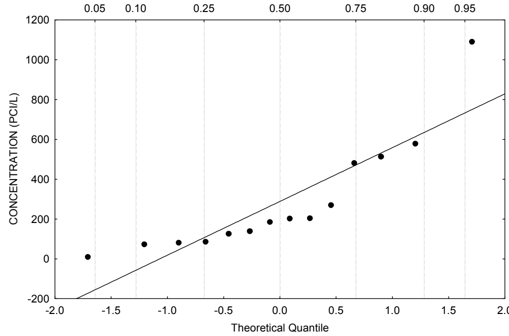

TOTAL COPPER
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL COPPER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

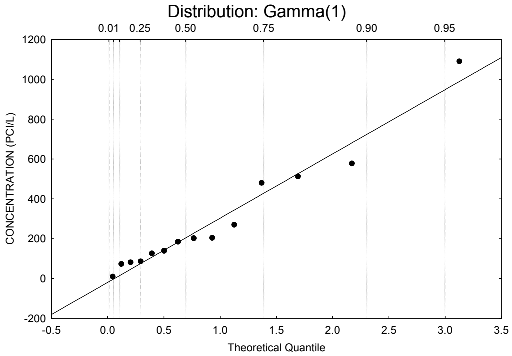
TOTAL COPPER
Distribution: Lognormal(1)



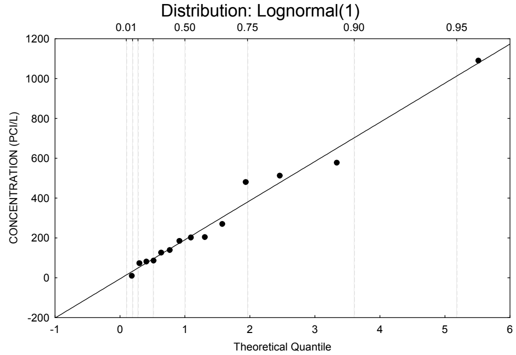
TOTAL GROSS ALPHA
Distribution: Normal



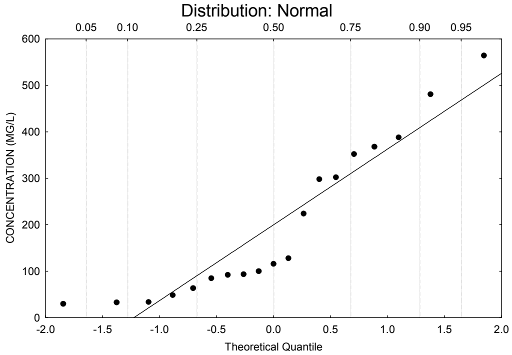
TOTAL GROSS ALPHA
Distribution: Gamma(1)



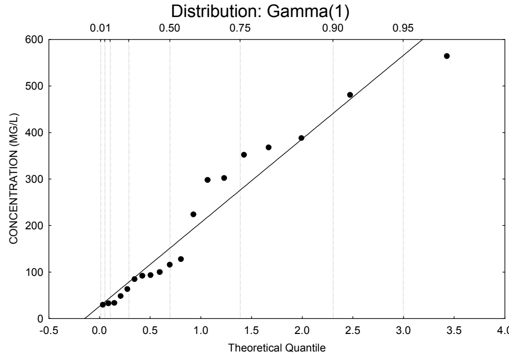
TOTAL GROSS ALPHA
Distribution: Lognormal(1)



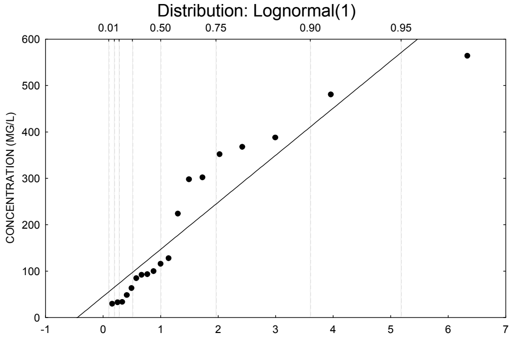
TOTAL HARDNESS
Distribution: Normal



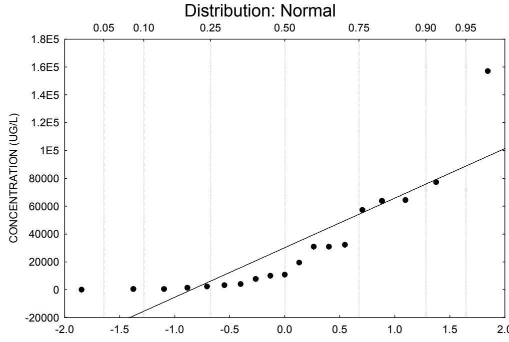
TOTAL HARDNESS
Distribution: Gamma(1)

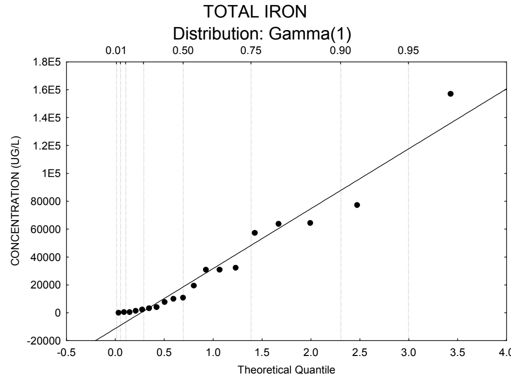


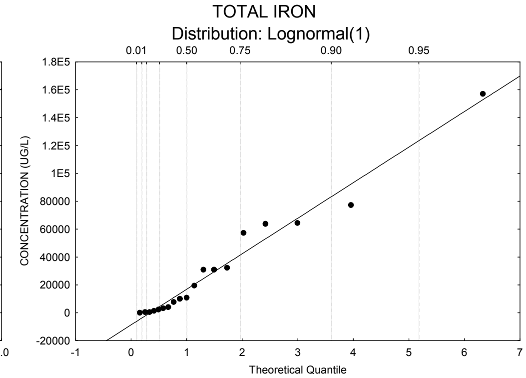
TOTAL HARDNESS
Distribution: Lognormal(1)

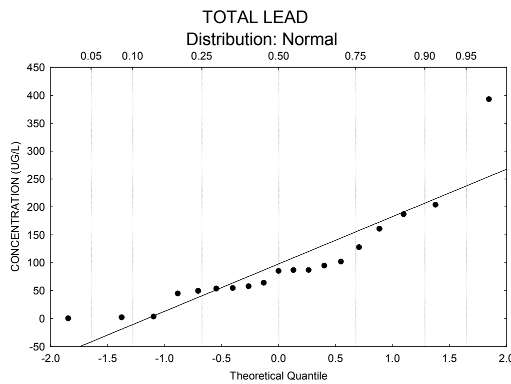


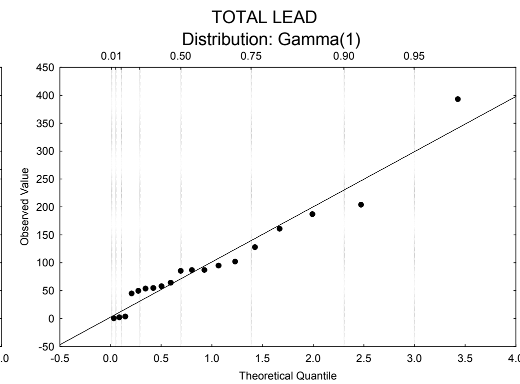
TOTAL IRON
Distribution: Normal

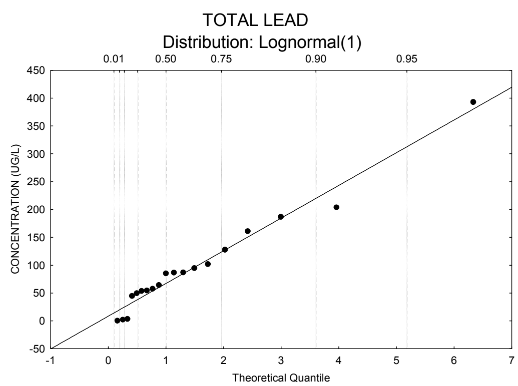


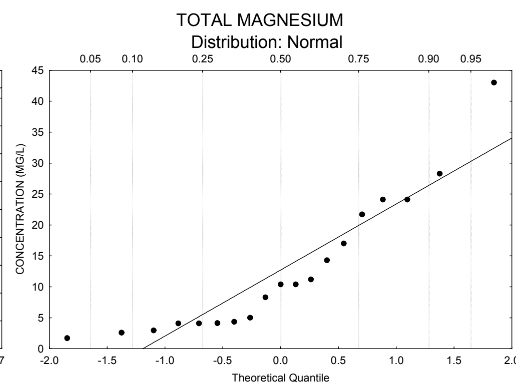

TOTAL IRON
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

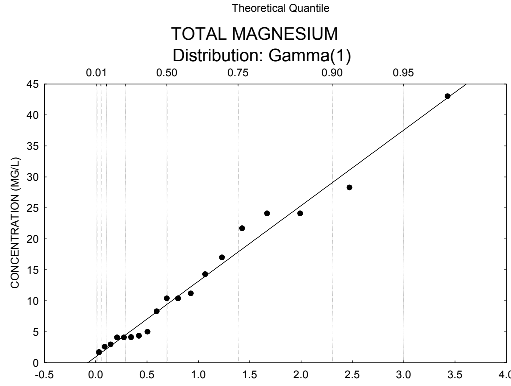

TOTAL IRON
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

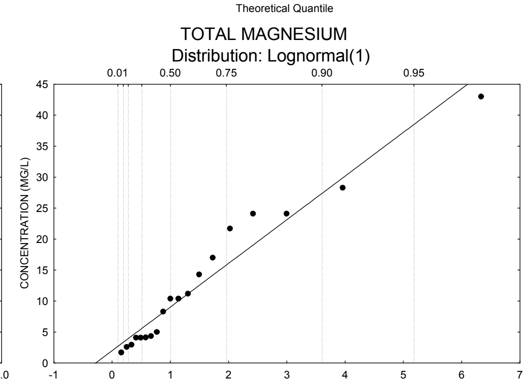

TOTAL LEAD
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

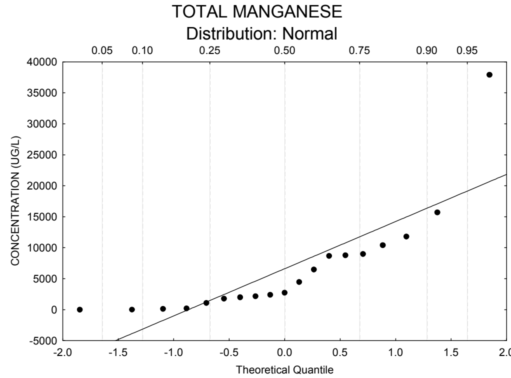

TOTAL LEAD
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95
Observed Value
Theoretical Quantile

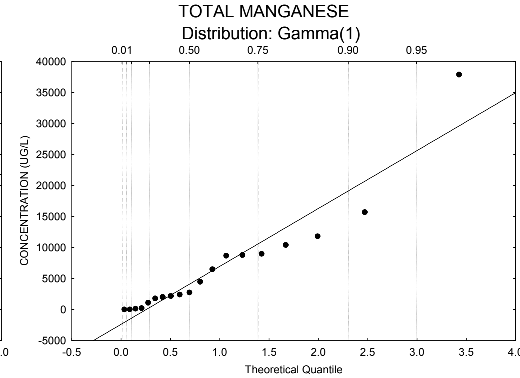

TOTAL LEAD
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

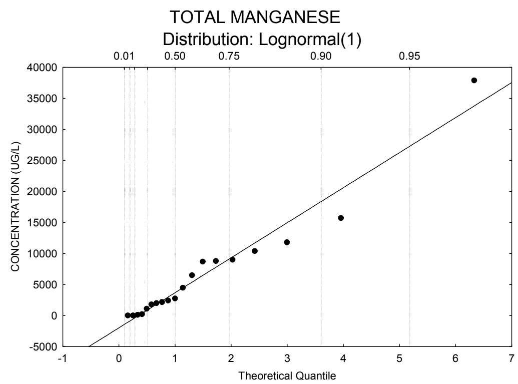

TOTAL MAGNESIUM
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (MG/L)
Theoretical Quantile

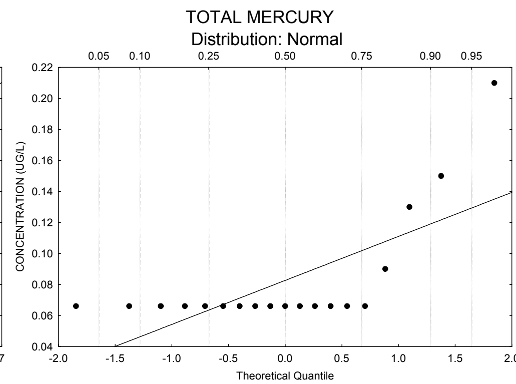

TOTAL MAGNESIUM
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (MG/L)
Theoretical Quantile

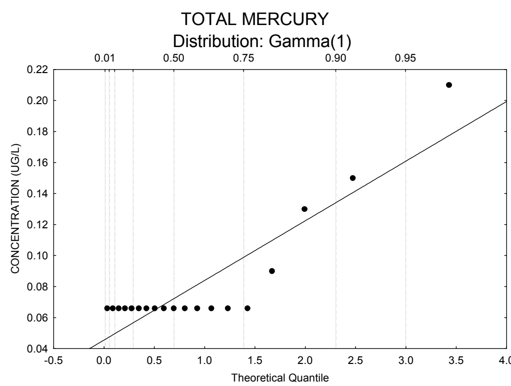

TOTAL MAGNESIUM
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (MG/L)
Theoretical Quantile

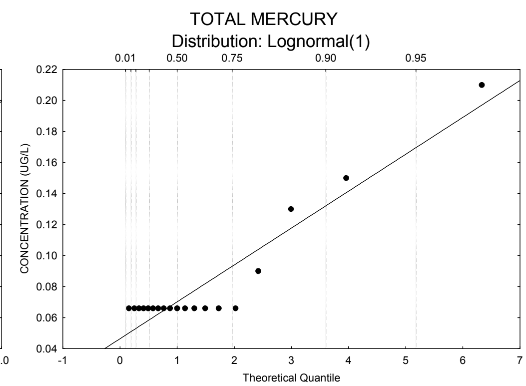

TOTAL MANGANESE
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

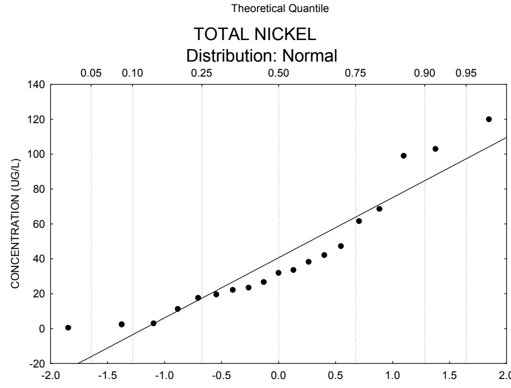

TOTAL MANGANESE
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

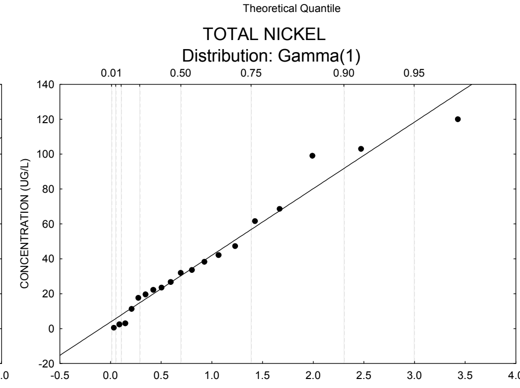

TOTAL MANGANESE
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

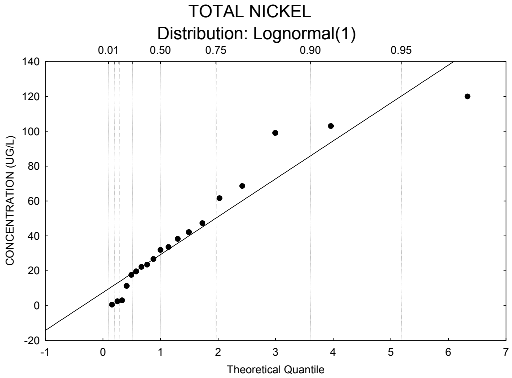

TOTAL MERCURY
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

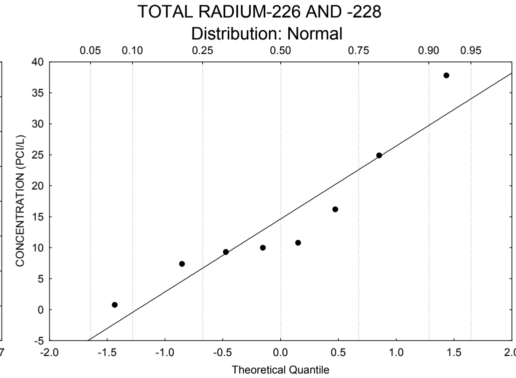

TOTAL MERCURY
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

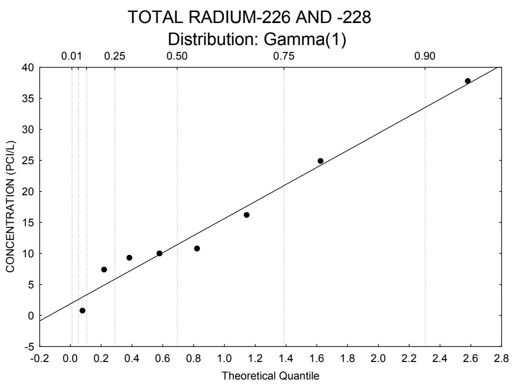

TOTAL MERCURY
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

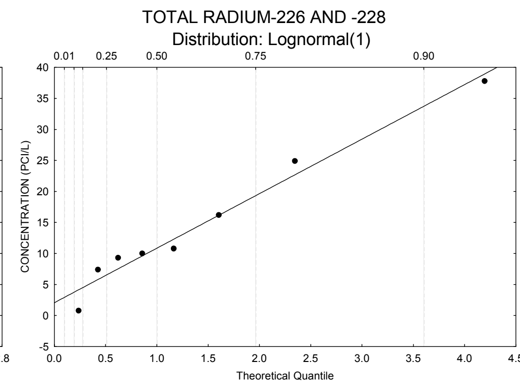

TOTAL NICKEL
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

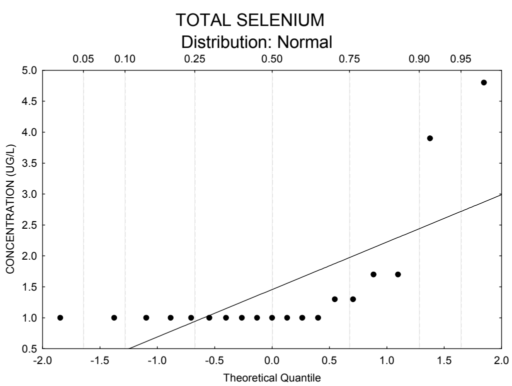

TOTAL NICKEL
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

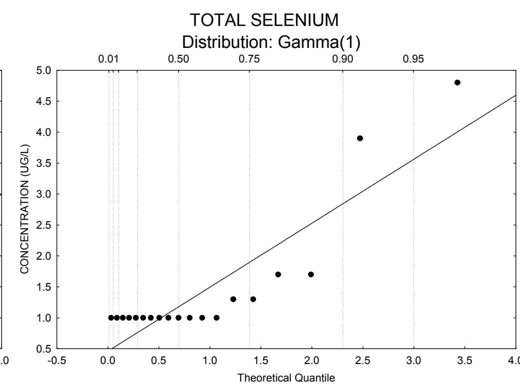

TOTAL NICKEL
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

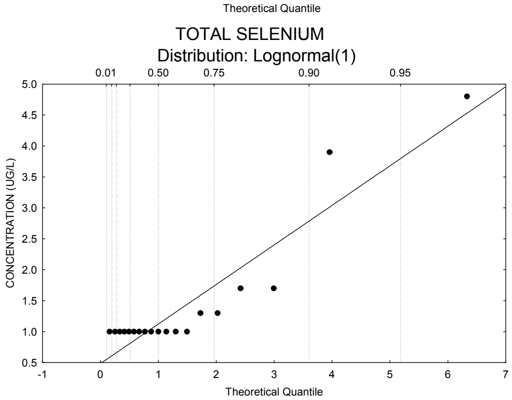

TOTAL RADIUM-226 AND -228
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (PCI/L)
Theoretical Quantile

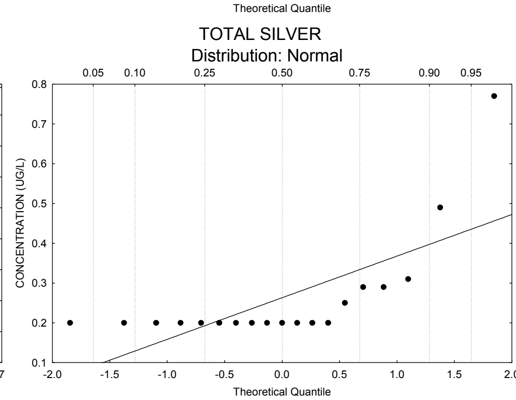

TOTAL RADIUM-226 AND -228
Distribution: Gamma(1)
0.01 0.25 0.50 0.75 0.90
CONCENTRATION (PCI/L)
Theoretical Quantile

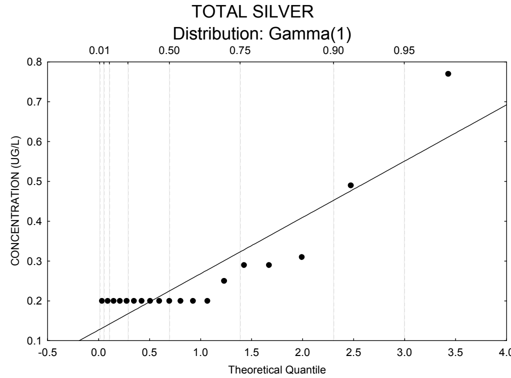

TOTAL RADIUM-226 AND -228
Distribution: Lognormal(1)
0.01 0.25 0.50 0.75 0.90
CONCENTRATION (PCI/L)
Theoretical Quantile

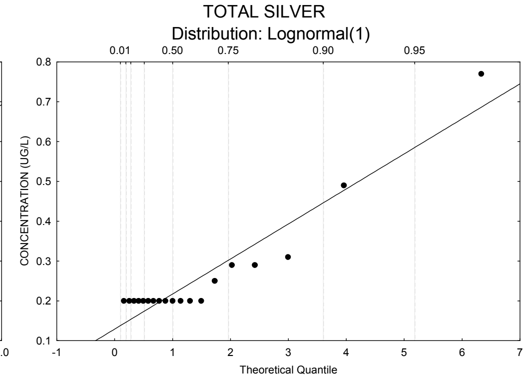

TOTAL SELENIUM
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

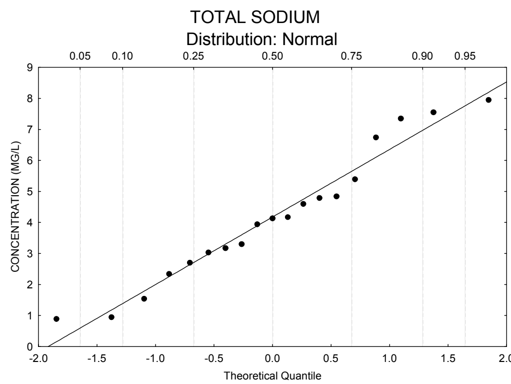

TOTAL SELENIUM
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

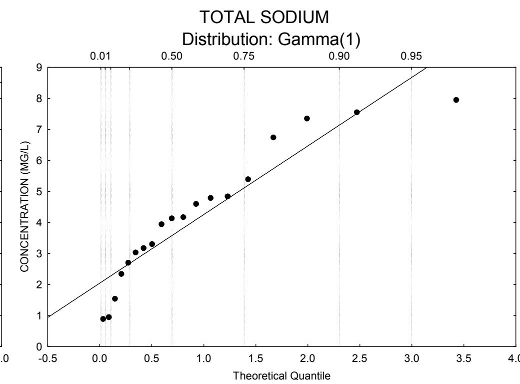

TOTAL SELENIUM
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

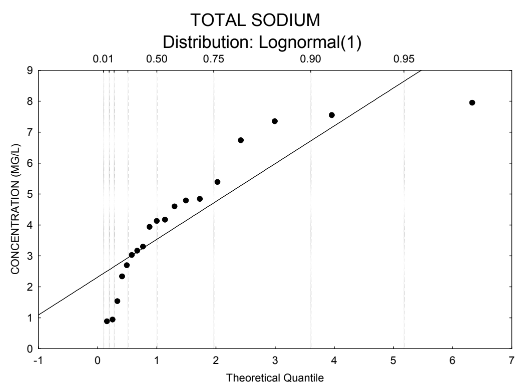

TOTAL SILVER
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

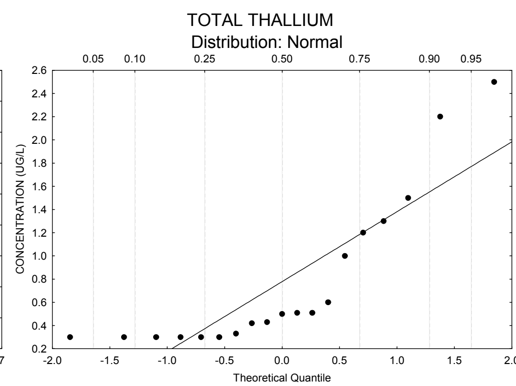

TOTAL SILVER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

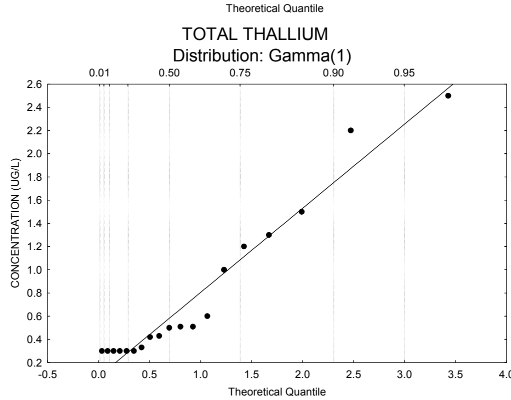

TOTAL SILVER
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

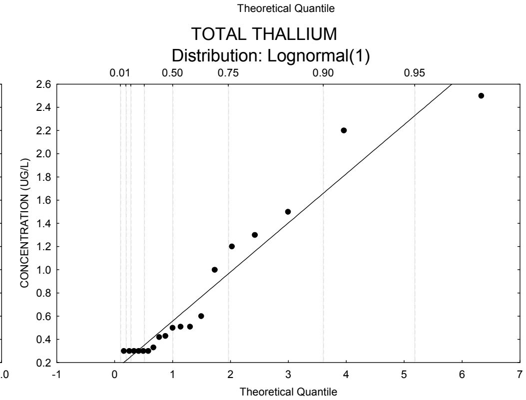

TOTAL SODIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

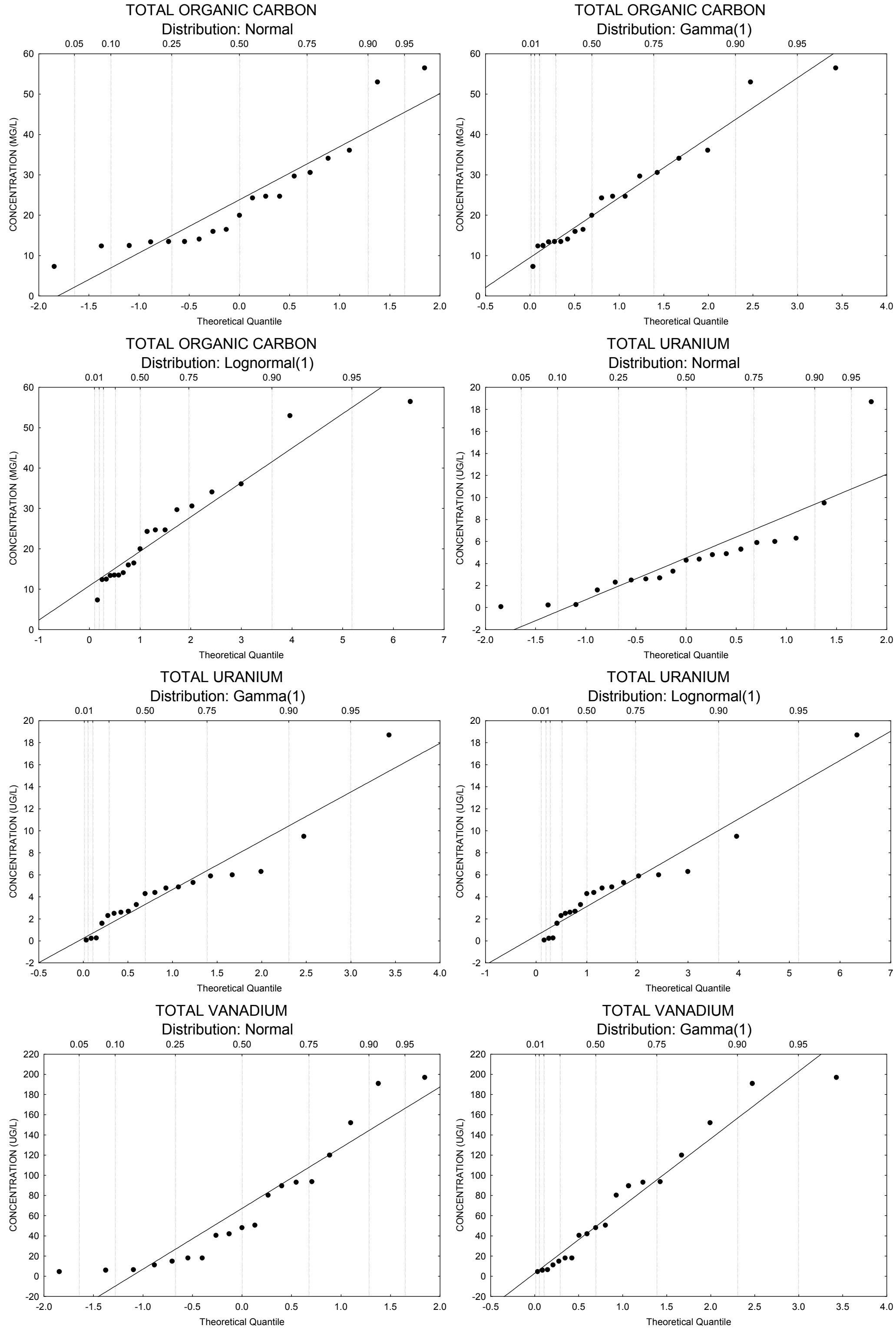

TOTAL SODIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

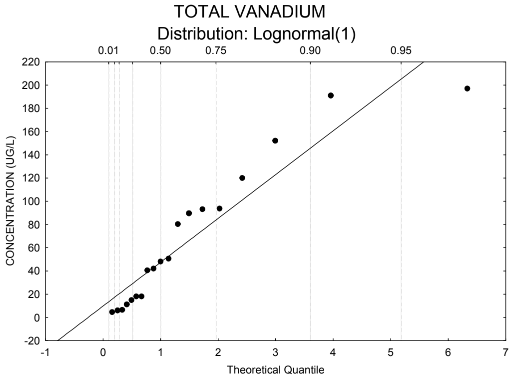

TOTAL SODIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

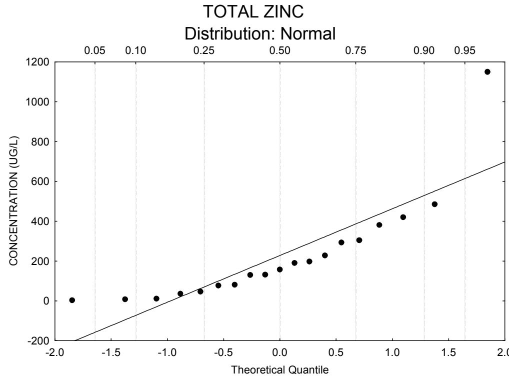

TOTAL THALLIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

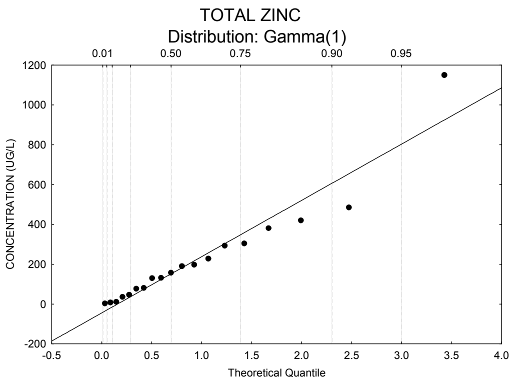

TOTAL THALLIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

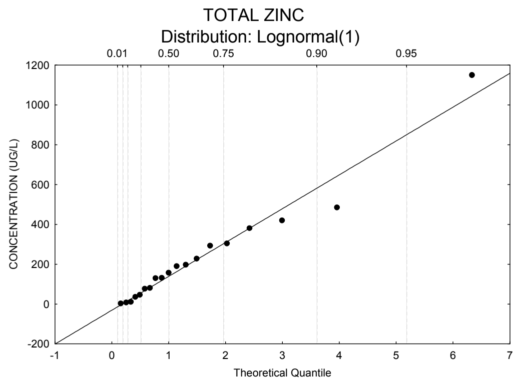

TOTAL THALLIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL ORGANIC CARBON
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile
TOTAL ORGANIC CARBON
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile
TOTAL ORGANIC CARBON
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile
TOTAL URANIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile
TOTAL URANIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile
TOTAL URANIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile
TOTAL VANADIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile
TOTAL VANADIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

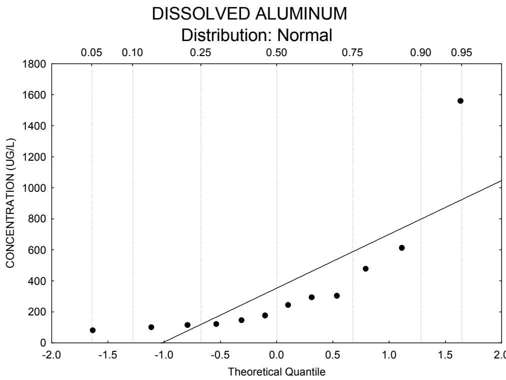

TOTAL VANADIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

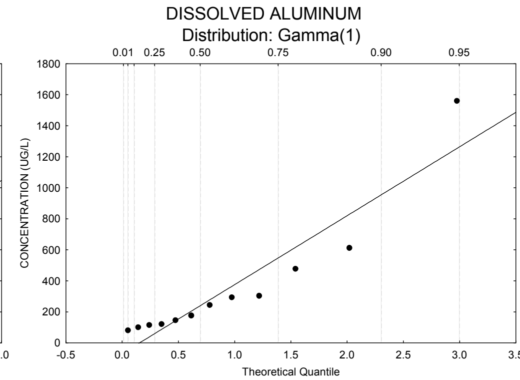

TOTAL ZINC
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

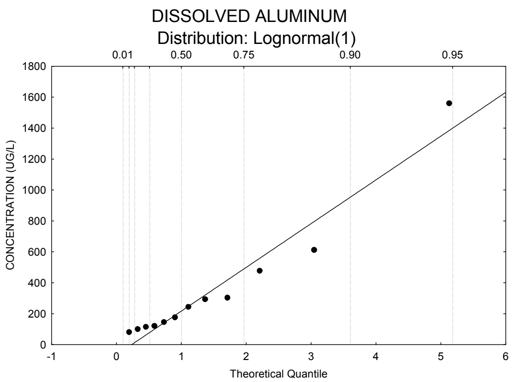

TOTAL ZINC
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

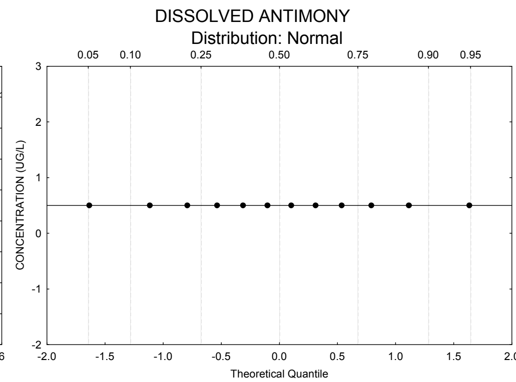

TOTAL ZINC
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

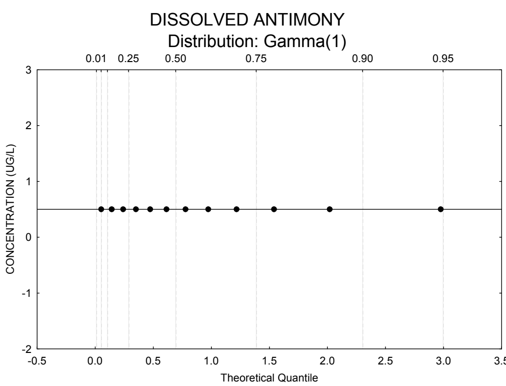
Western Boundary Area

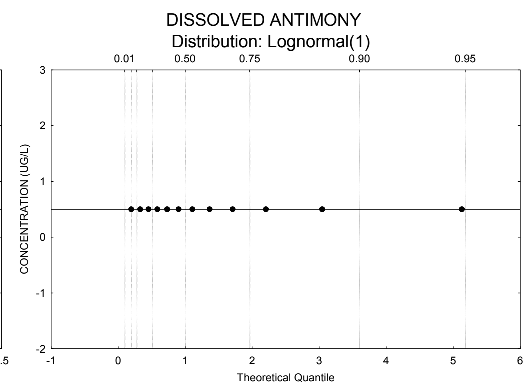


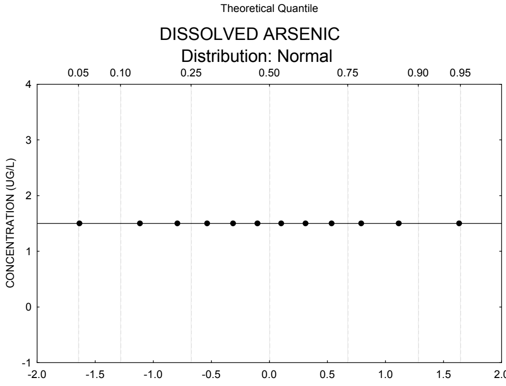


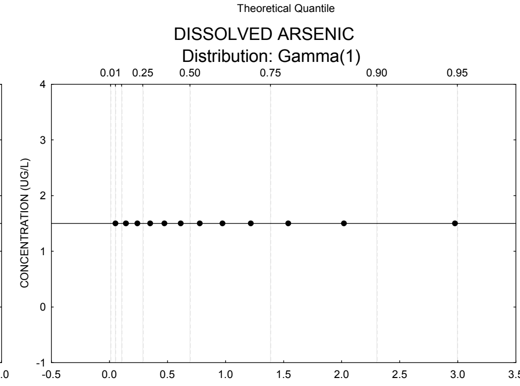




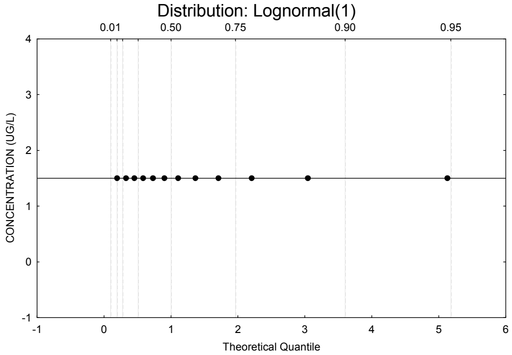




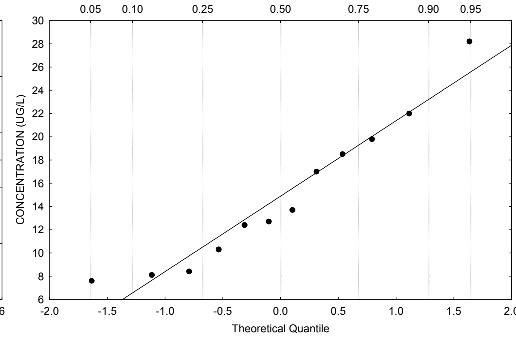




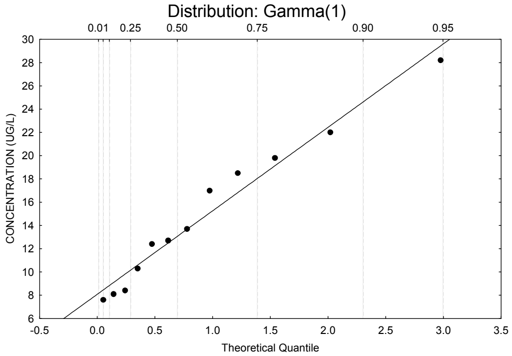
DISSOLVED ARSENIC
Distribution: Lognormal(1)



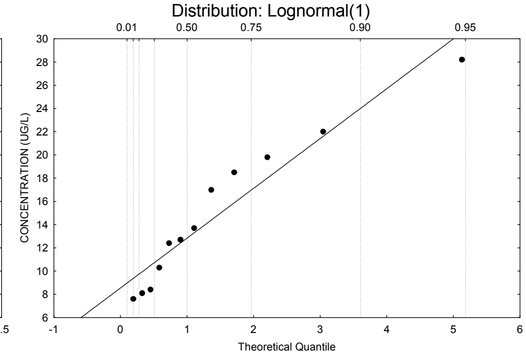
DISSOLVED BARIUM
Distribution: Normal



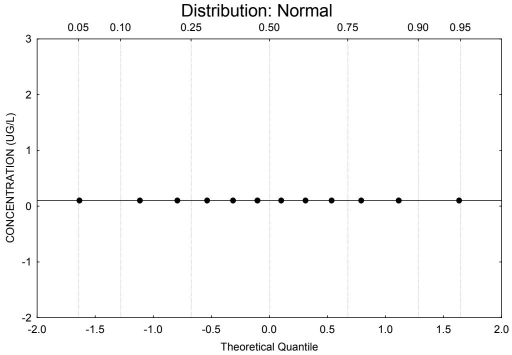
DISSOLVED BARIUM
Distribution: Gamma(1)



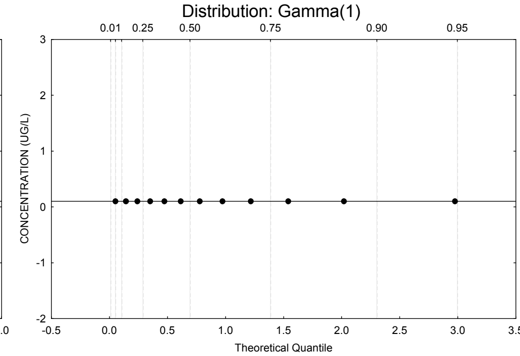
DISSOLVED BARIUM
Distribution: Lognormal(1)



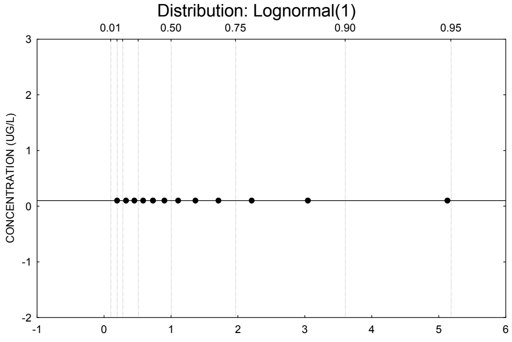
DISSOLVED BERYLLUM
Distribution: Normal



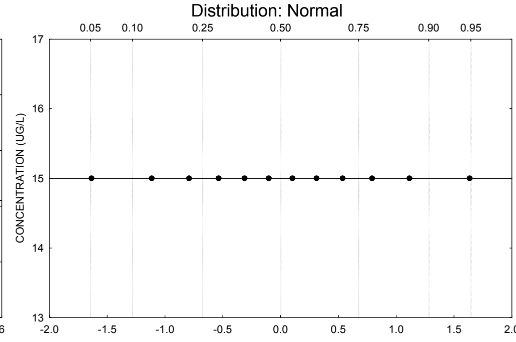
DISSOLVED BERYLLIUM
Distribution: Gamma(1)

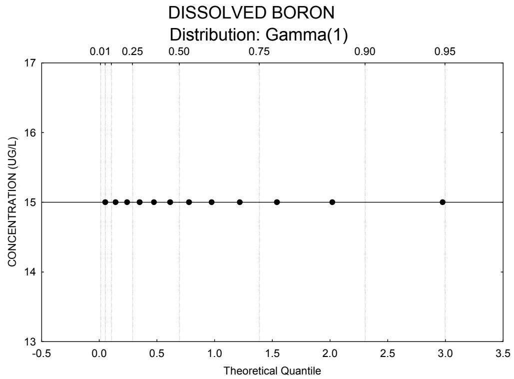


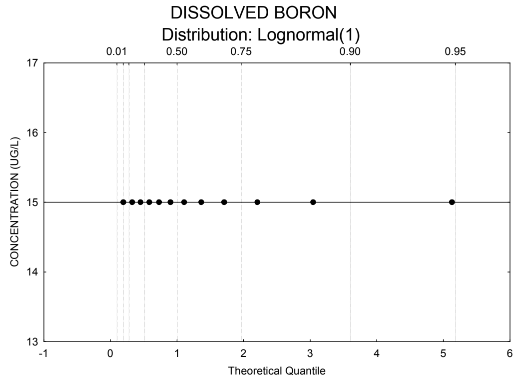
DISSOLVED BERYLLIUM
Distribution: Lognormal(1)

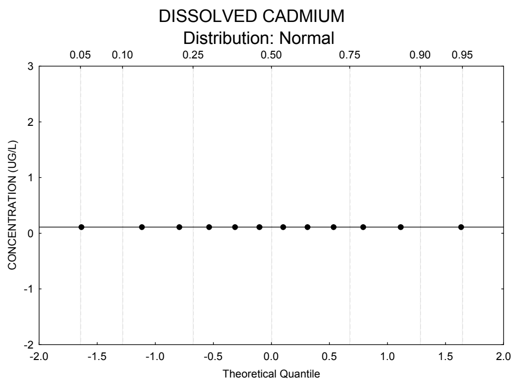


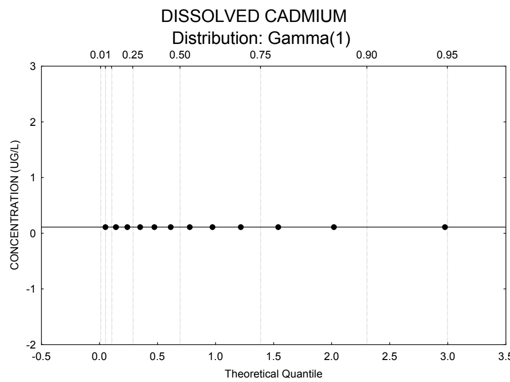
DISSOLVED BORON
Distribution: Normal

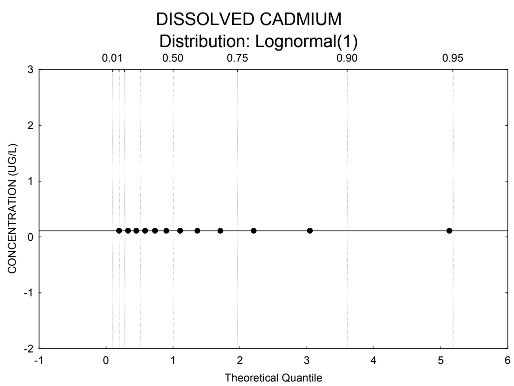


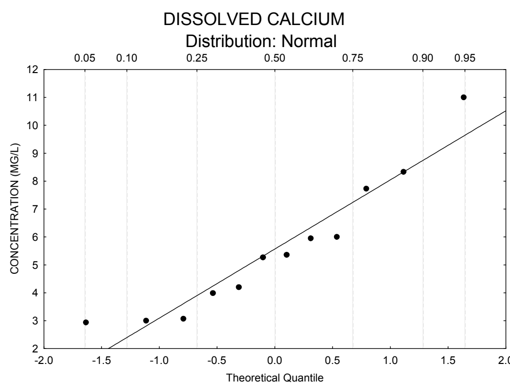

DISSOLVED BORON
Distribution: Gamma(1)
0.01 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

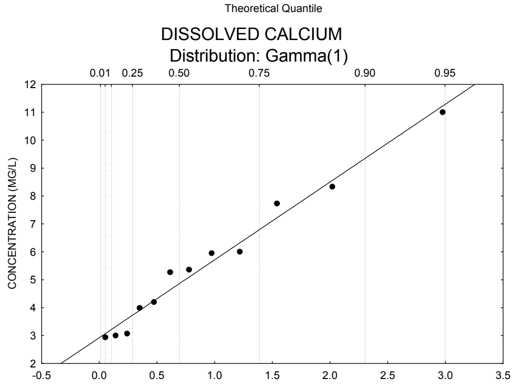

DISSOLVED BORON
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

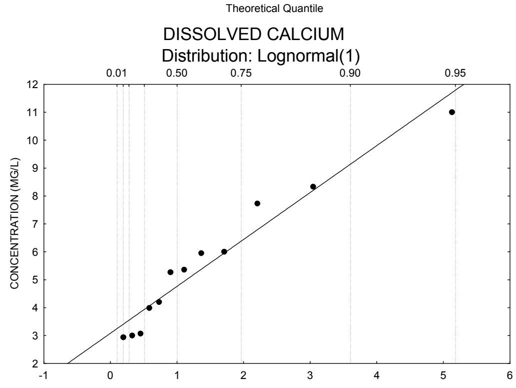

DISSOLVED CADMIUM
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

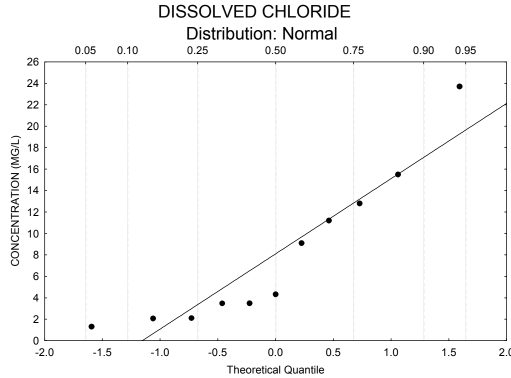

DISSOLVED CADMIUM
Distribution: Gamma(1)
0.01 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

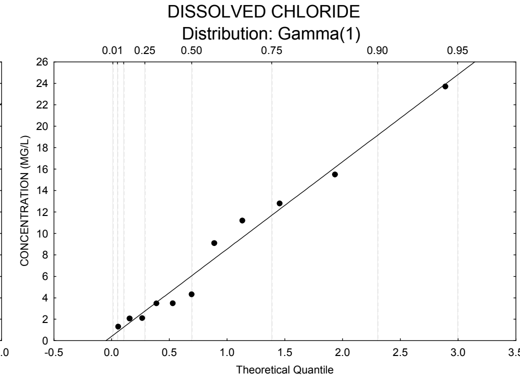

DISSOLVED CADMIUM
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

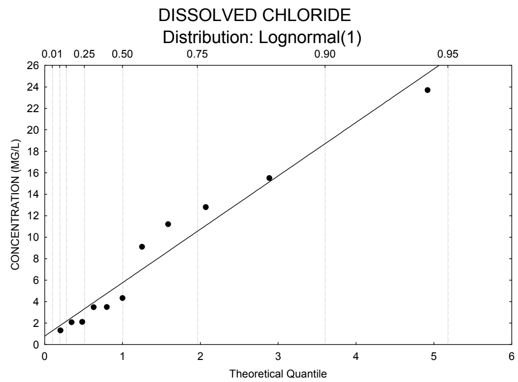

DISSOLVED CALCIUM
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (MG/L)
Theoretical Quantile

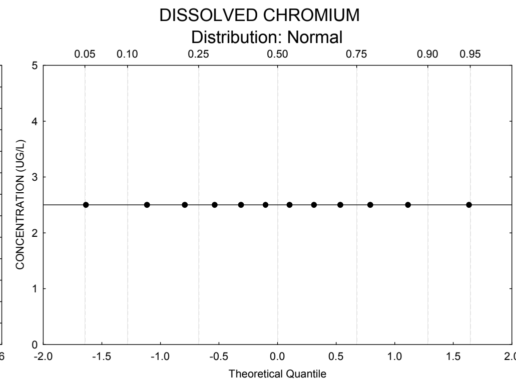

DISSOLVED CALCIUM
Distribution: Gamma(1)
0.01 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (MG/L)
Theoretical Quantile

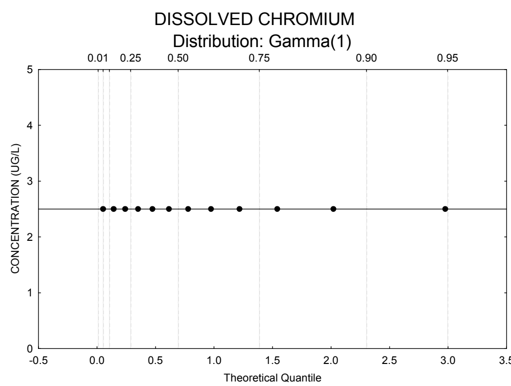

DISSOLVED CALCIUM
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (MG/L)
Theoretical Quantile

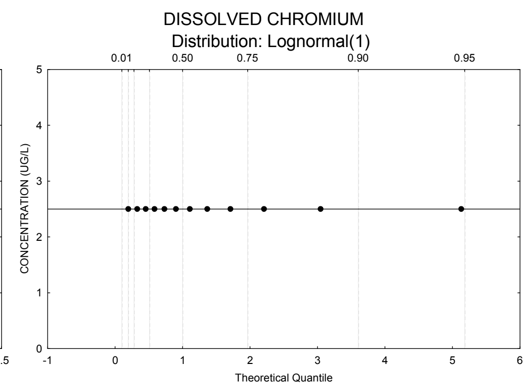

DISSOLVED CHLORIDE
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

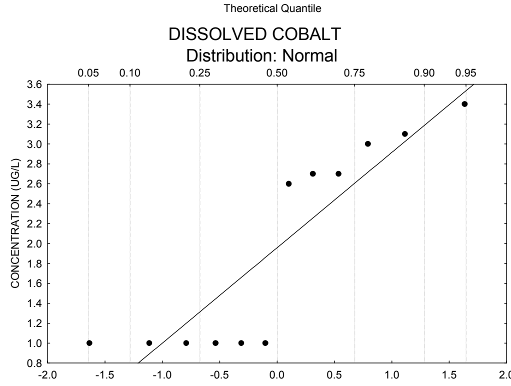

DISSOLVED CHLORIDE
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

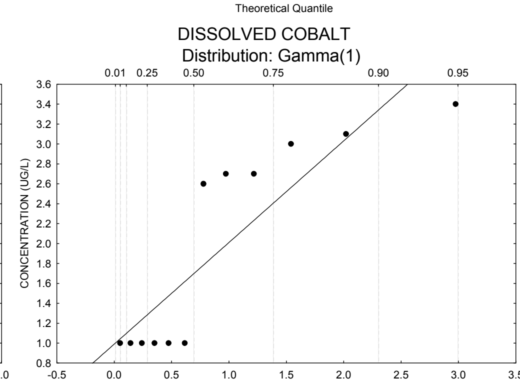

DISSOLVED CHLORIDE
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

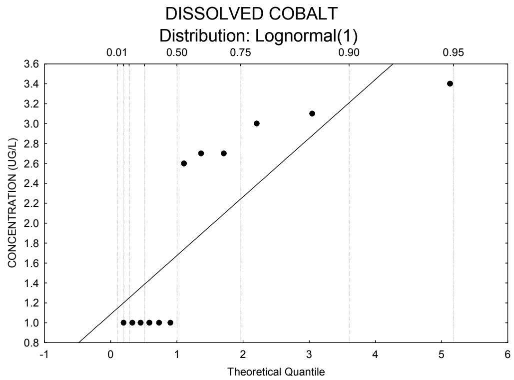

DISSOLVED CHROMIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

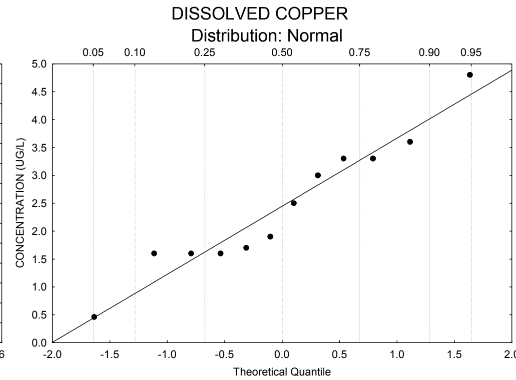

DISSOLVED CHROMIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

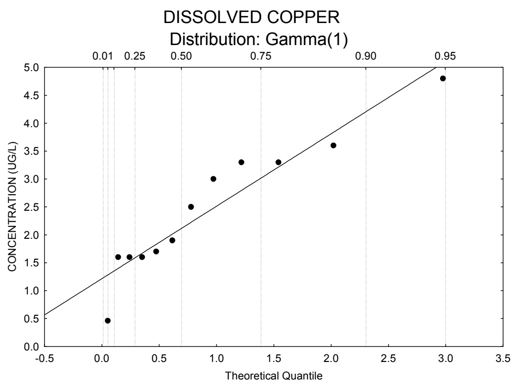

DISSOLVED CHROMIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

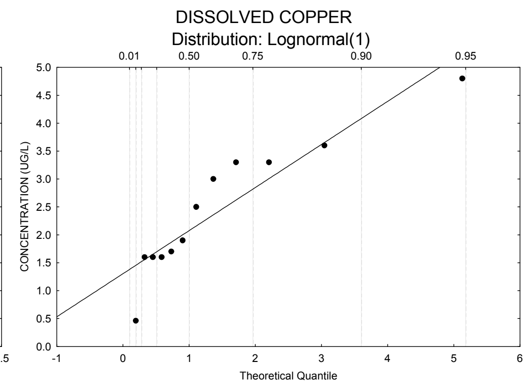

DISSOLVED COBALT
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

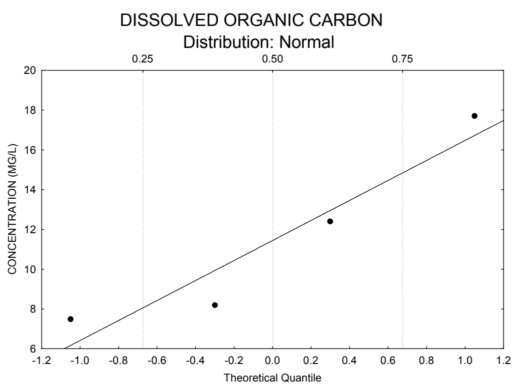

DISSOLVED COBALT
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

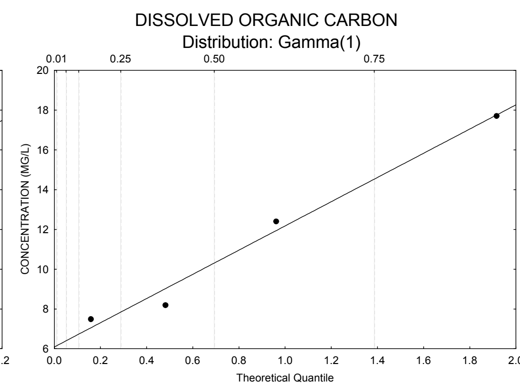

DISSOLVED COBALT
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

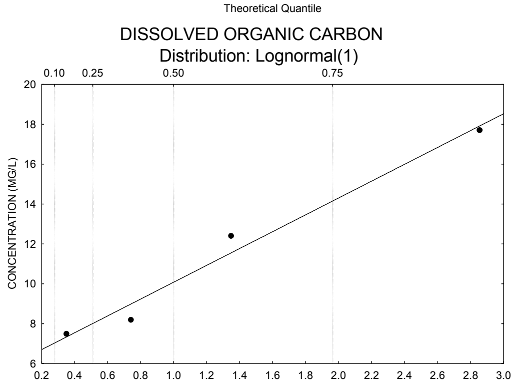

DISSOLVED COPPER
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

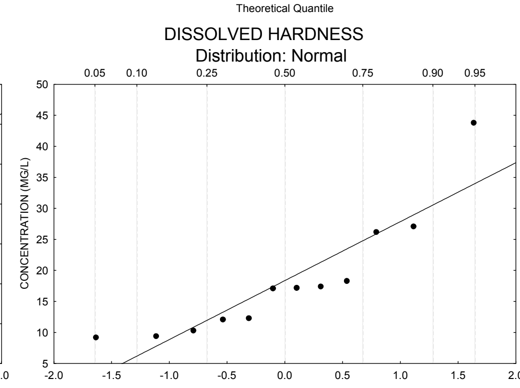

DISSOLVED COPPER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

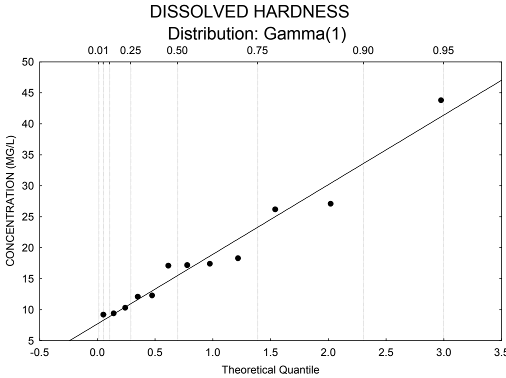

DISSOLVED COPPER
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

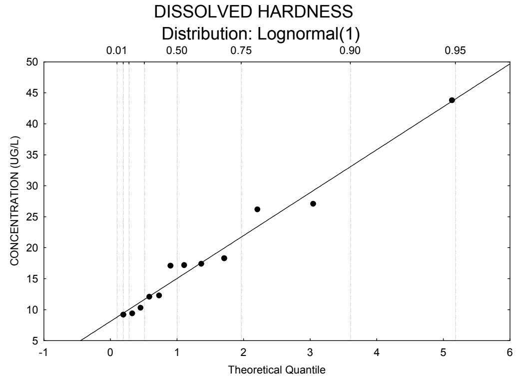

DISSOLVED ORGANIC CARBON
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

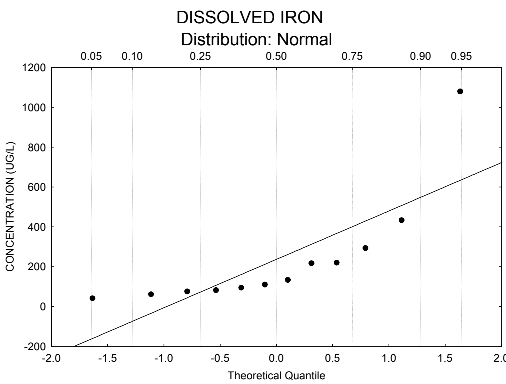

DISSOLVED ORGANIC CARBON
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

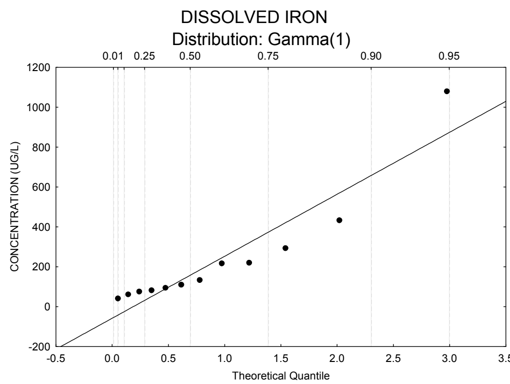

DISSOLVED ORGANIC CARBON
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

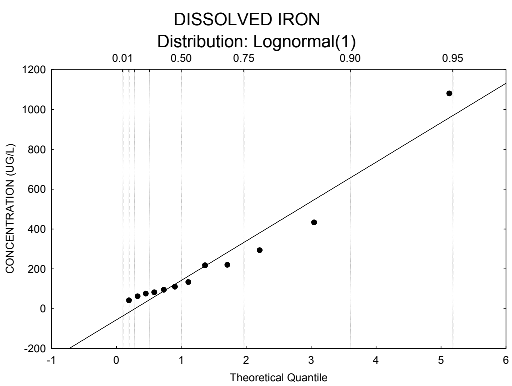

DISSOLVED HARDNESS
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

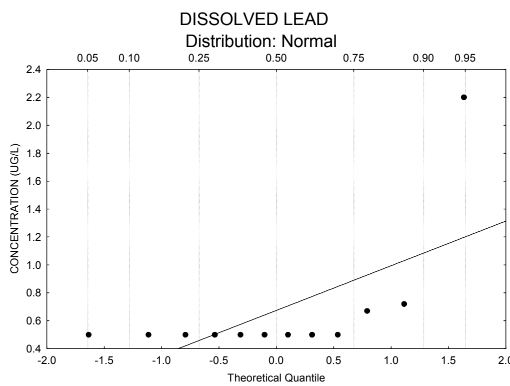

DISSOLVED HARDNESS
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

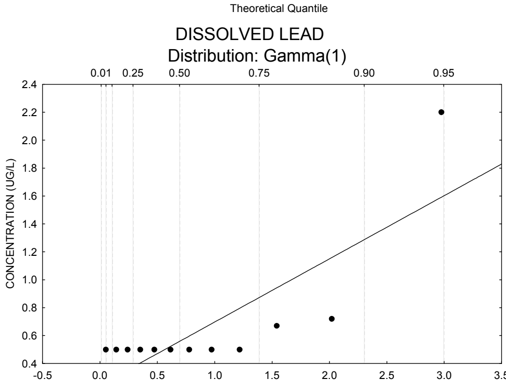

DISSOLVED HARDNESS
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

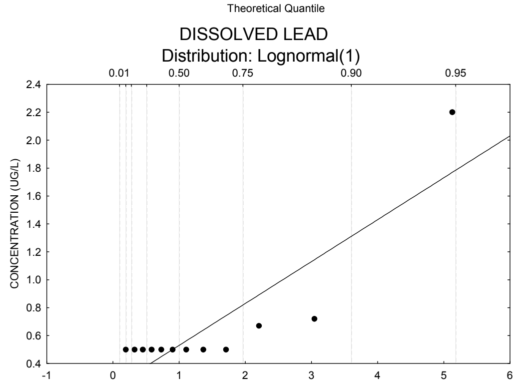

DISSOLVED IRON
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

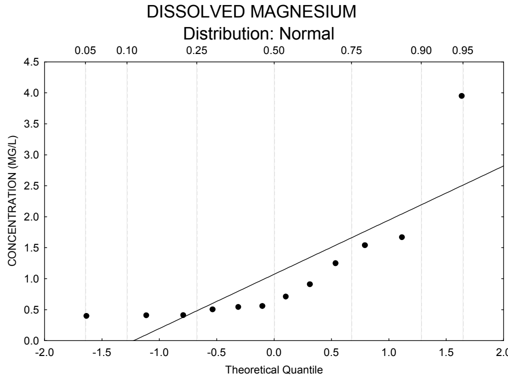

DISSOLVED IRON
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

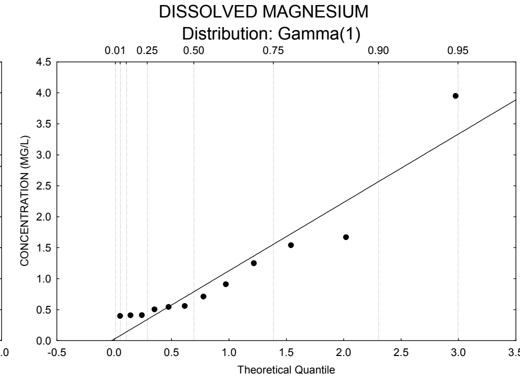

DISSOLVED IRON
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

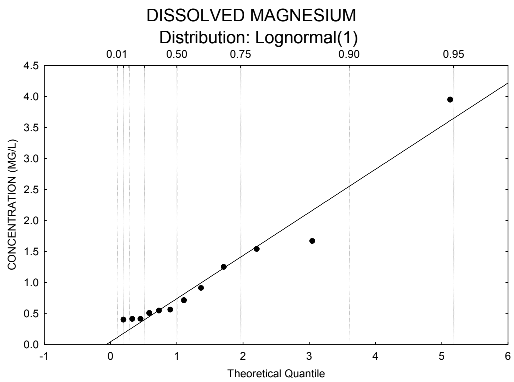

DISSOLVED LEAD
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

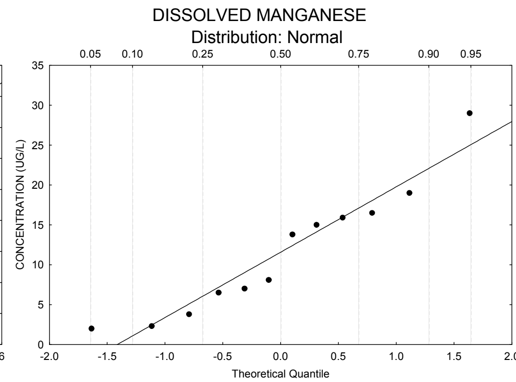

DISSOLVED LEAD
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

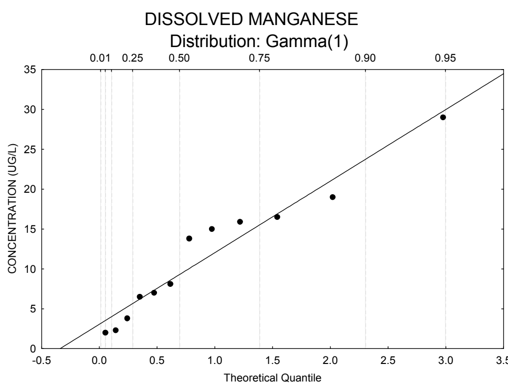

DISSOLVED LEAD
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

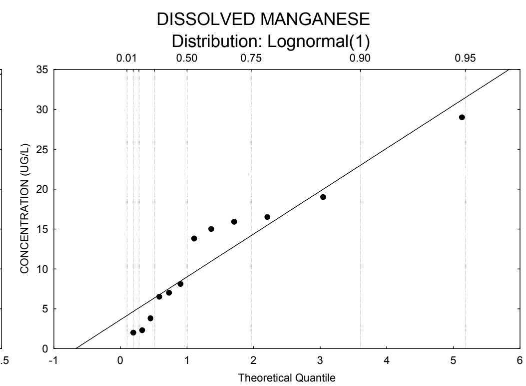

DISSOLVED MAGNESIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

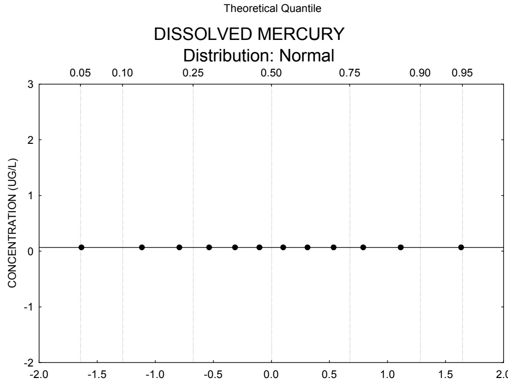

DISSOLVED MAGNESIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

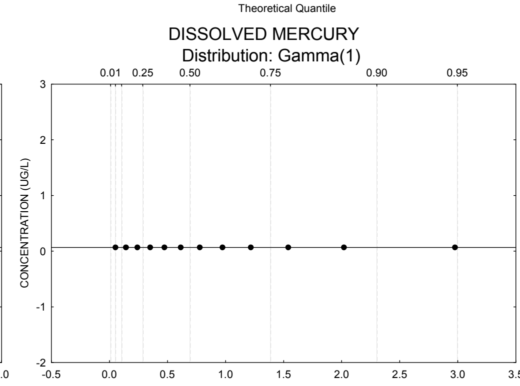

DISSOLVED MAGNESIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

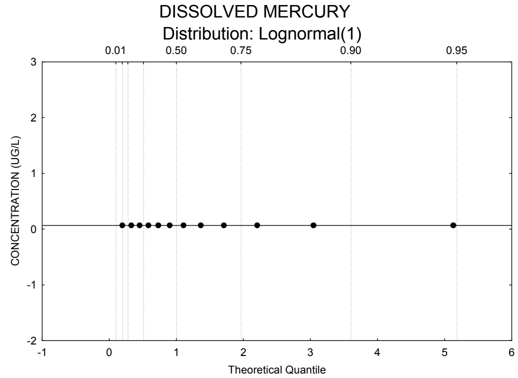

DISSOLVED MANGANESE
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

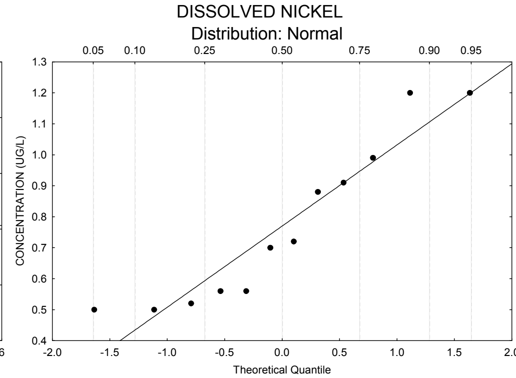

DISSOLVED MANGANESE
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

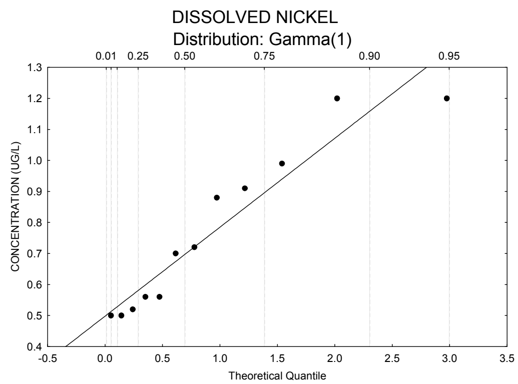

DISSOLVED MANGANESE
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

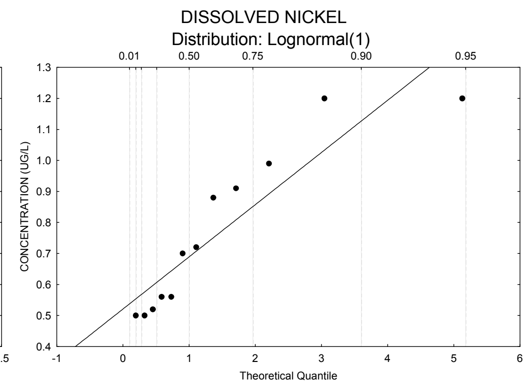

DISSOLVED MERCURY
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

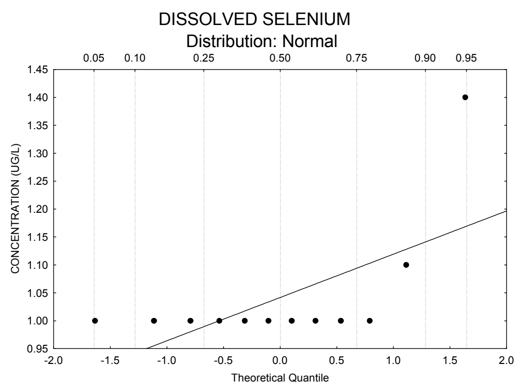

DISSOLVED MERCURY
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

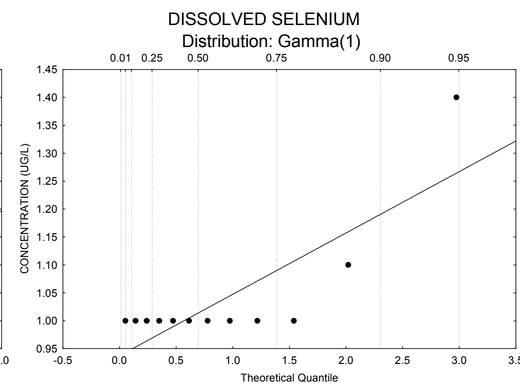

DISSOLVED MERCURY
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

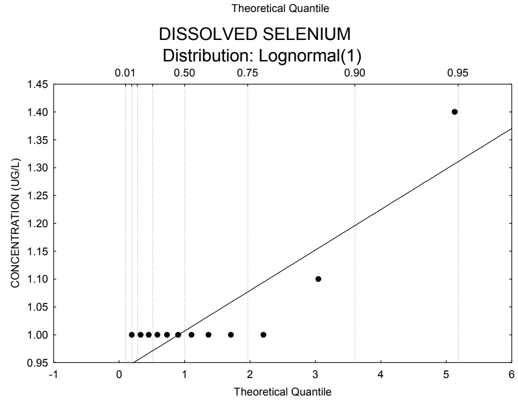

DISSOLVED NICKEL
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

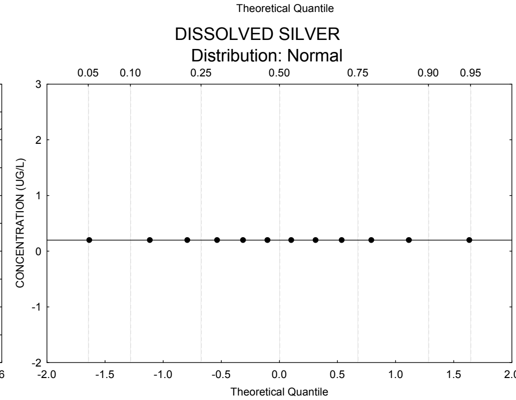

DISSOLVED NICKEL
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

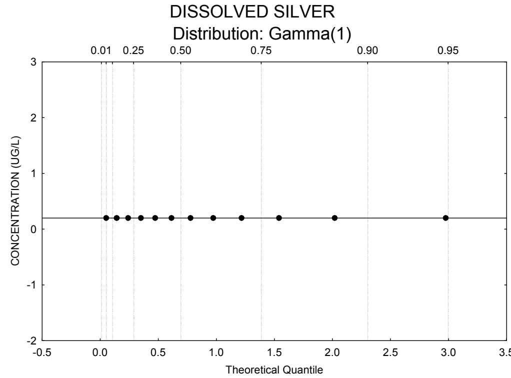

DISSOLVED NICKEL
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

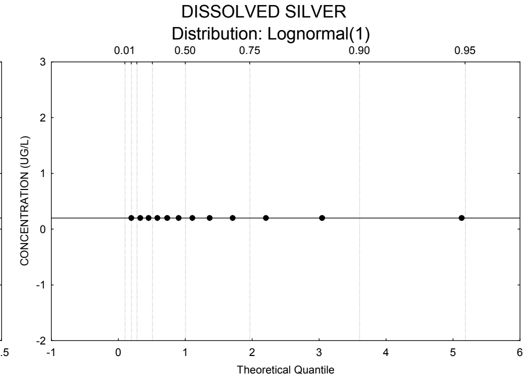

DISSOLVED SELENIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

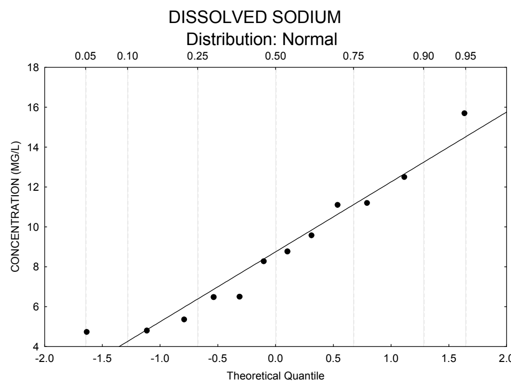

DISSOLVED SELENIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

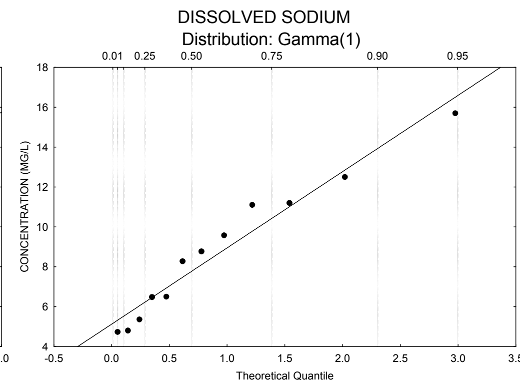

DISSOLVED SELENIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

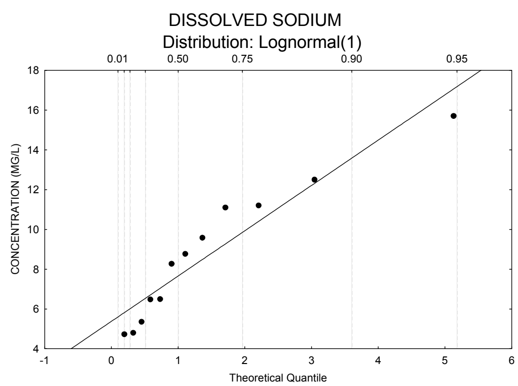

DISSOLVED SILVER
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

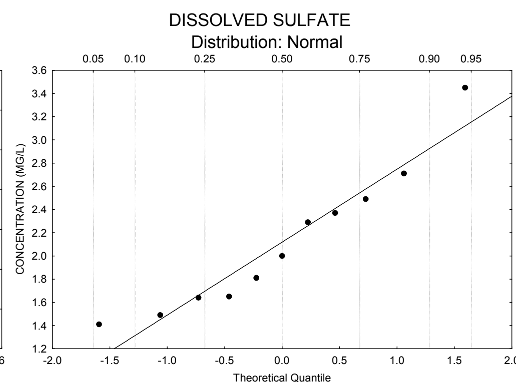

DISSOLVED SILVER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

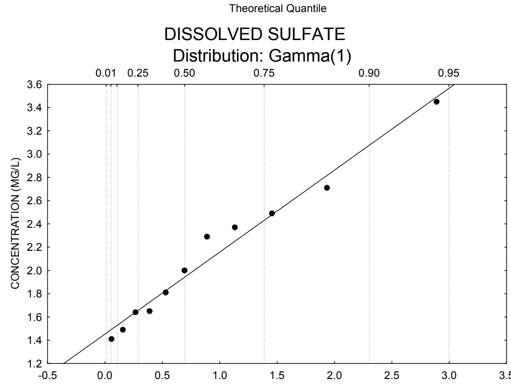

DISSOLVED SILVER
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

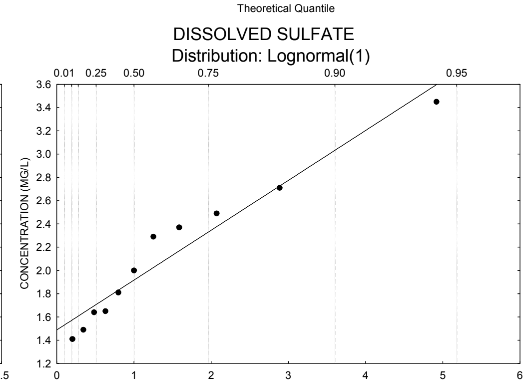

DISSOLVED SODIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

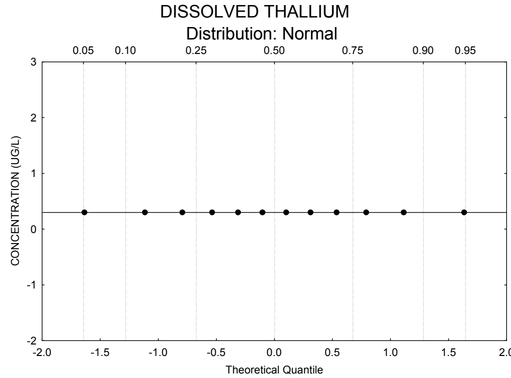

DISSOLVED SODIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

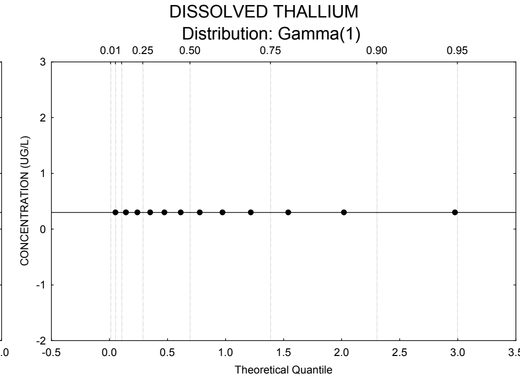

DISSOLVED SODIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

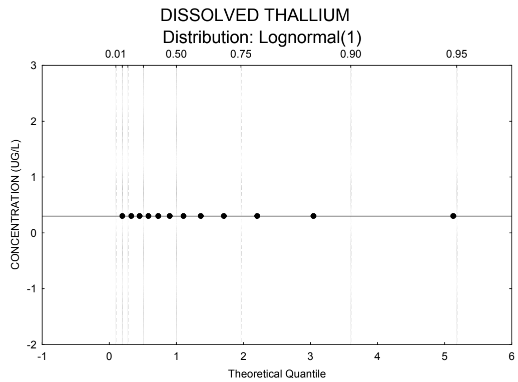

DISSOLVED SULFATE
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

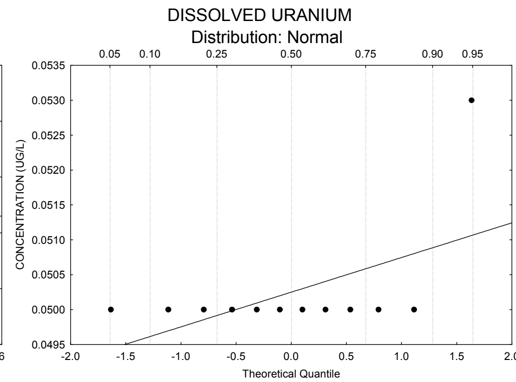

DISSOLVED SULFATE
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

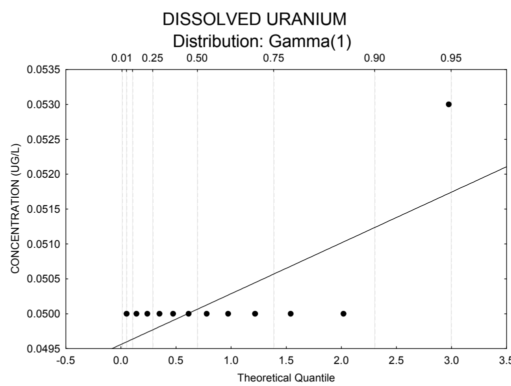

DISSOLVED SULFATE
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

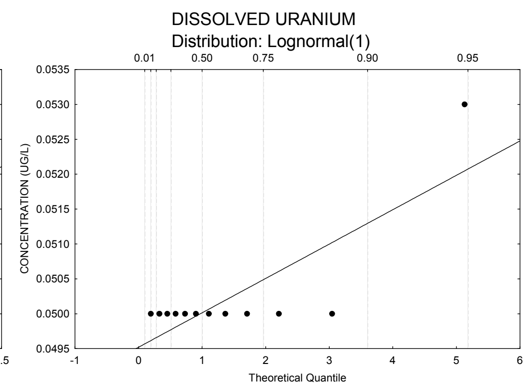

DISSOLVED THALLIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

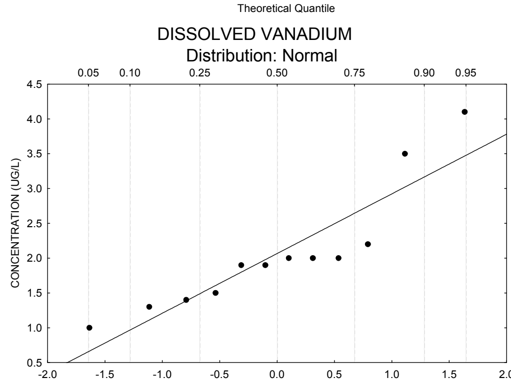

DISSOLVED THALLIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

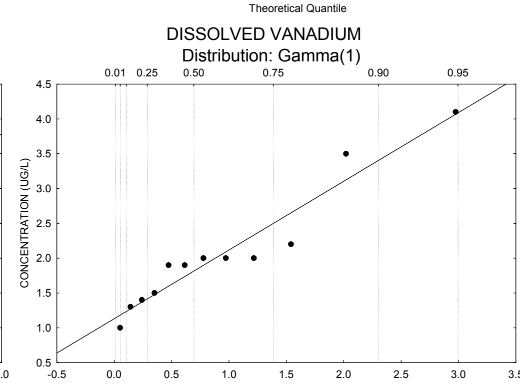

DISSOLVED THALLIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

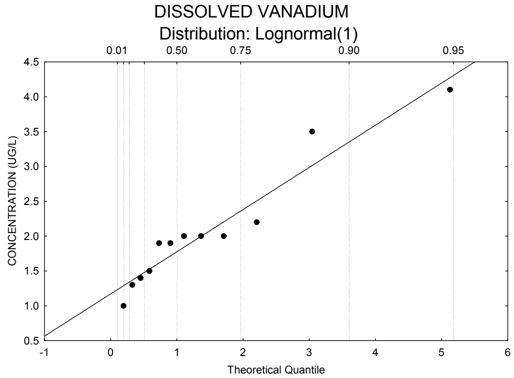

DISSOLVED URANIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

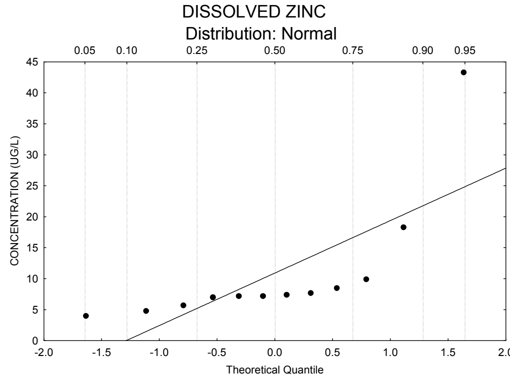

DISSOLVED URANIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

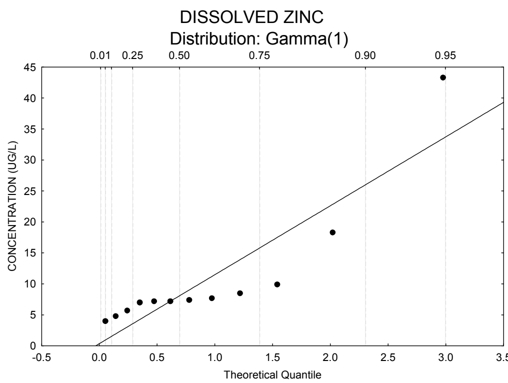

DISSOLVED URANIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

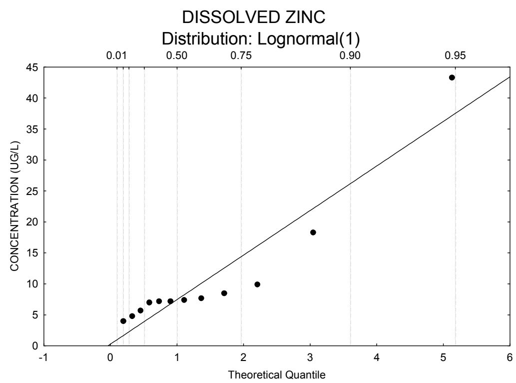

DISSOLVED VANADIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

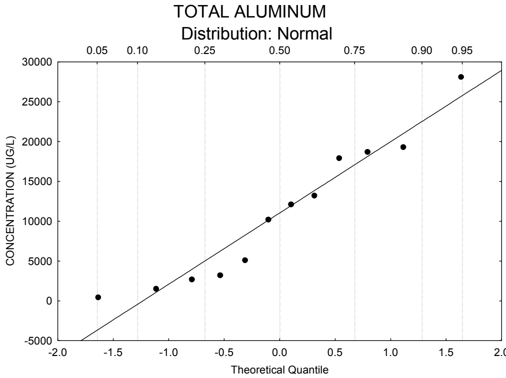

DISSOLVED VANADIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

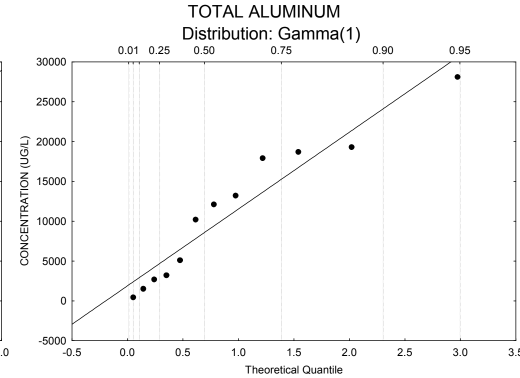

DISSOLVED VANADIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

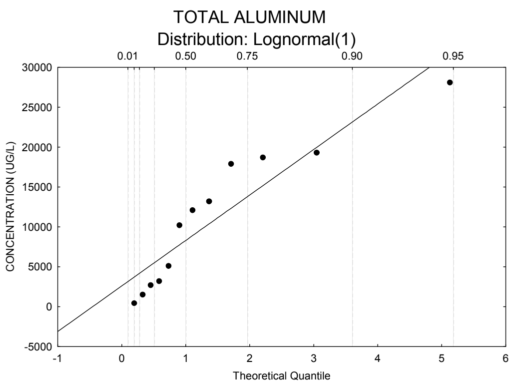

DISSOLVED ZINC
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

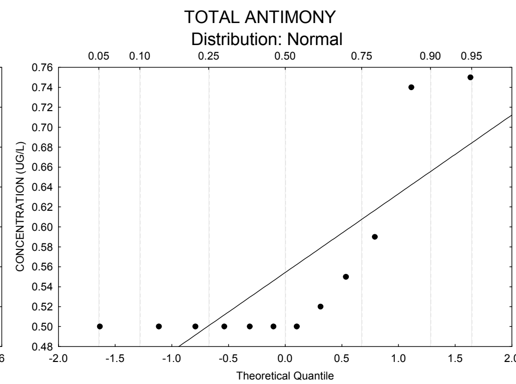

DISSOLVED ZINC
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

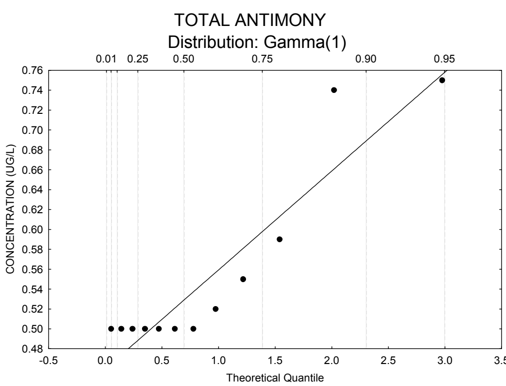

DISSOLVED ZINC
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

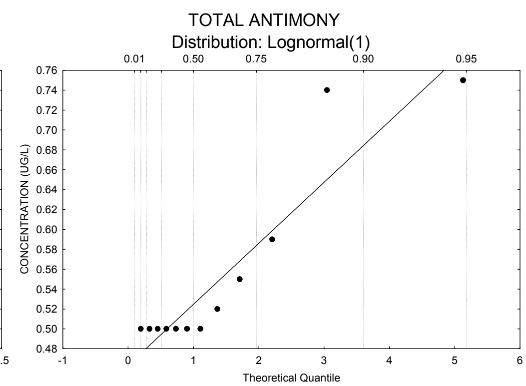

TOTAL ALUMINUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

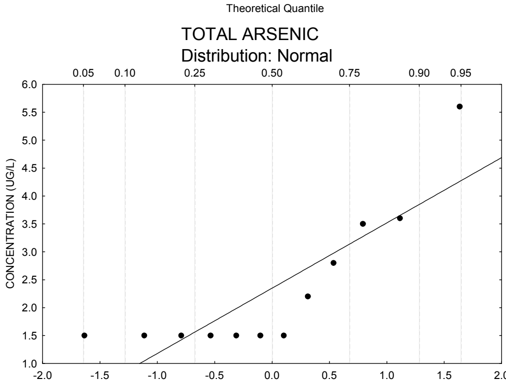

TOTAL ALUMINUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

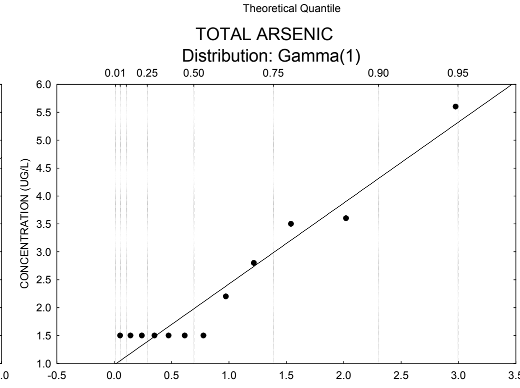

TOTAL ALUMINUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

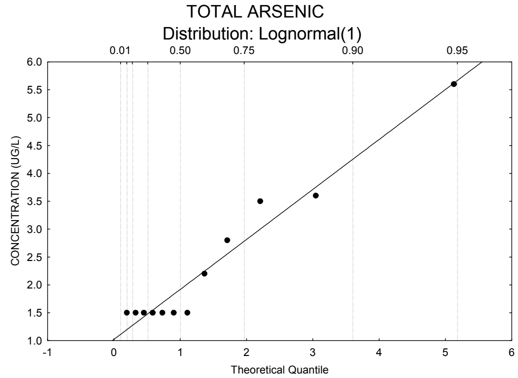

TOTAL ANTIMONY
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

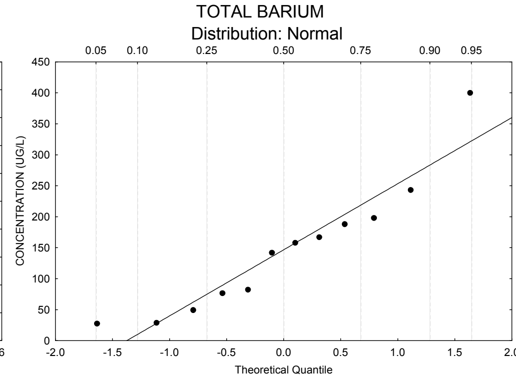

TOTAL ANTIMONY
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

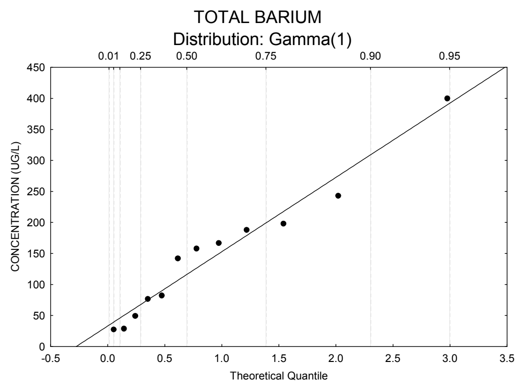

TOTAL ANTIMONY
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

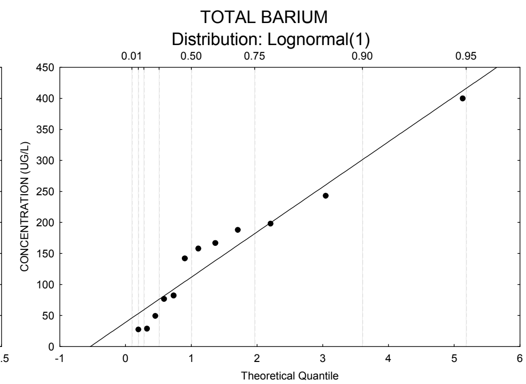

TOTAL ARSENIC
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

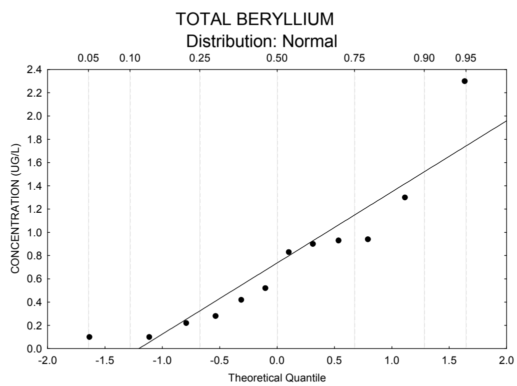

TOTAL ARSENIC
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

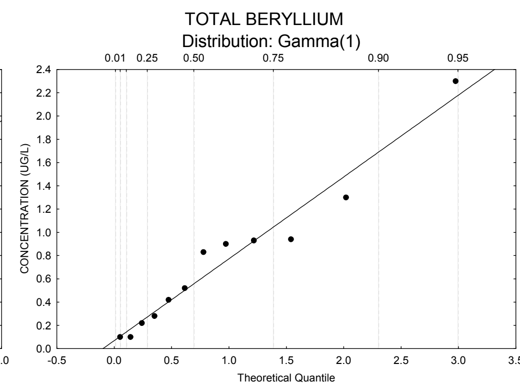

TOTAL ARSENIC
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

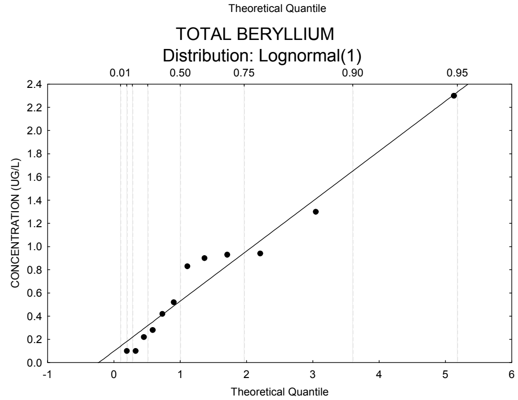

TOTAL BARIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

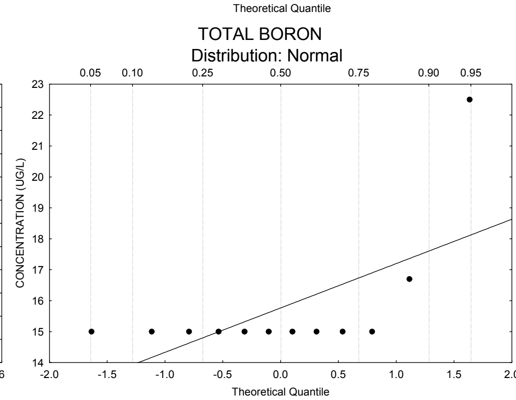

TOTAL BARIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

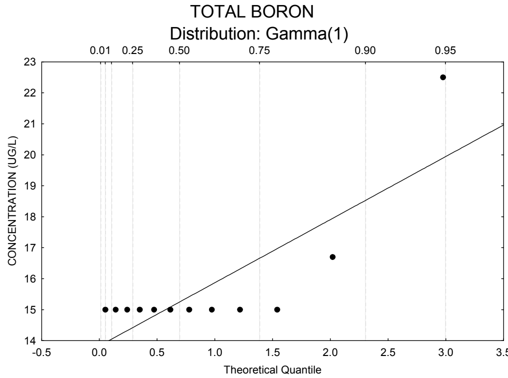

TOTAL BARIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

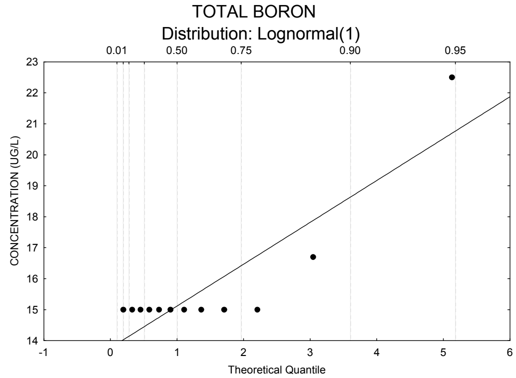

TOTAL BERYLLIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

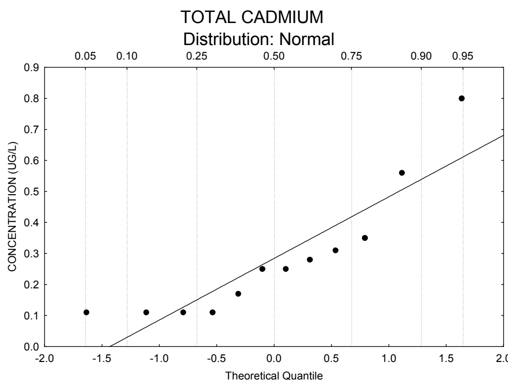

TOTAL BERYLLIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

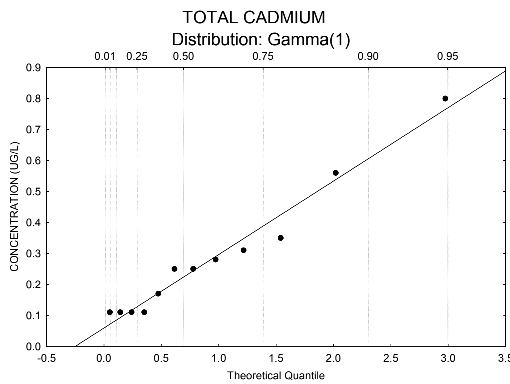

TOTAL BERYLLIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

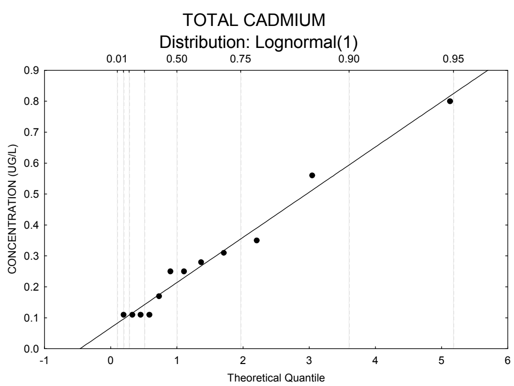

TOTAL BORON
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

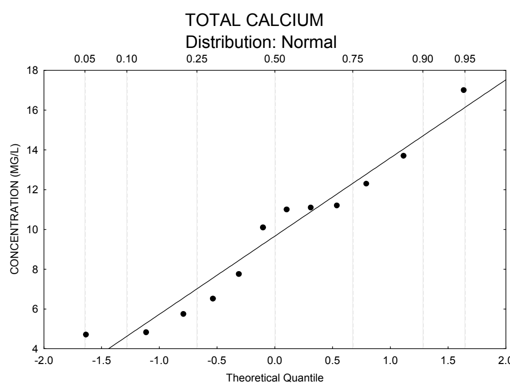

TOTAL BORON
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

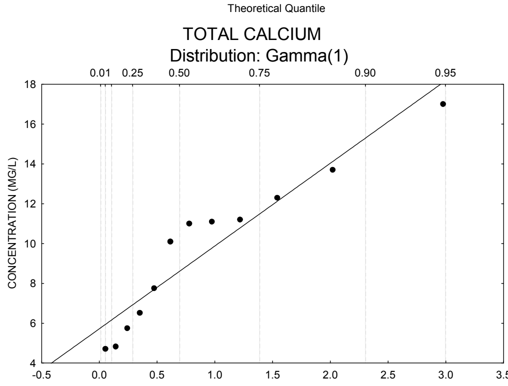

TOTAL BORON
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

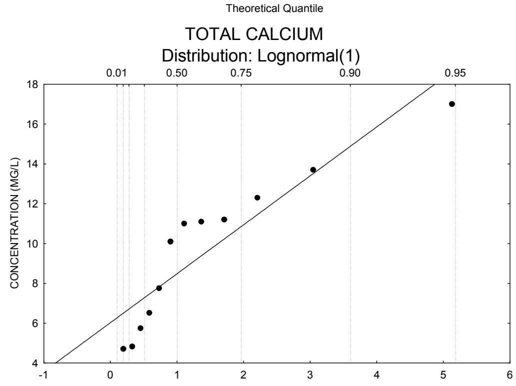

TOTAL CADMIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

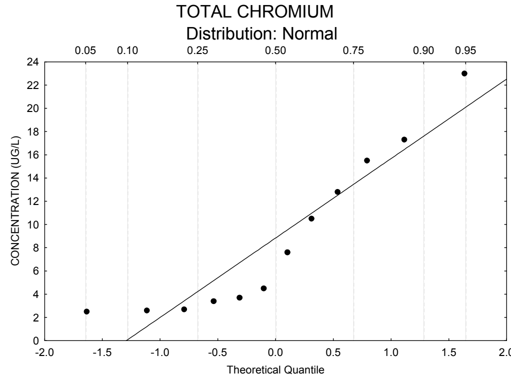

TOTAL CADMIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

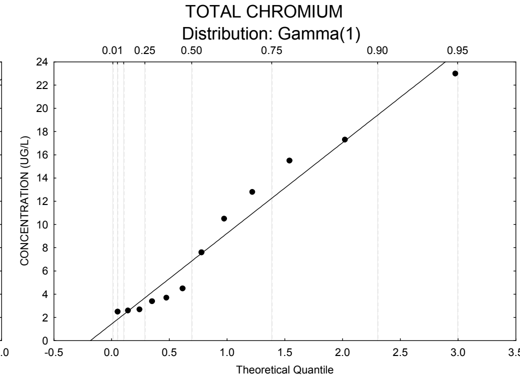

TOTAL CADMIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

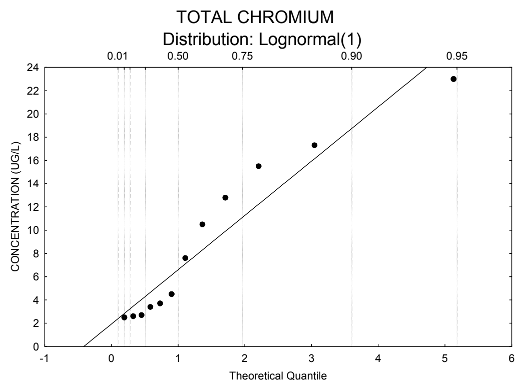

TOTAL CALCIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

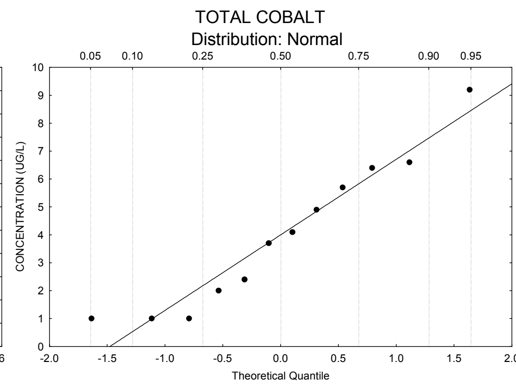

TOTAL CALCIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

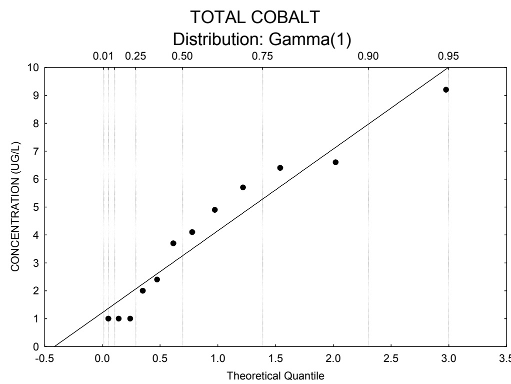

TOTAL CALCIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

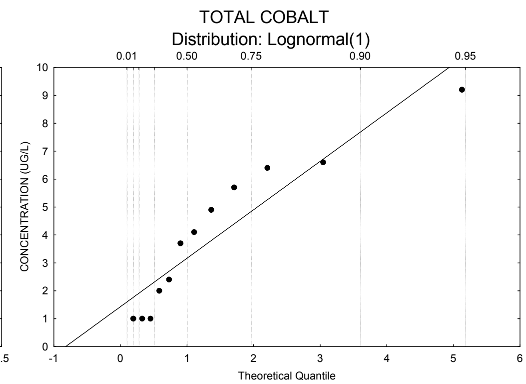

TOTAL CHROMIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

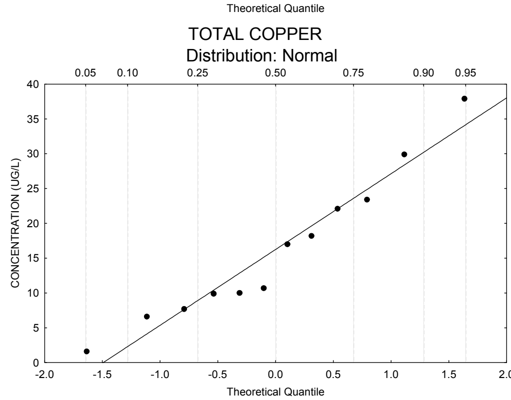

TOTAL CHROMIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

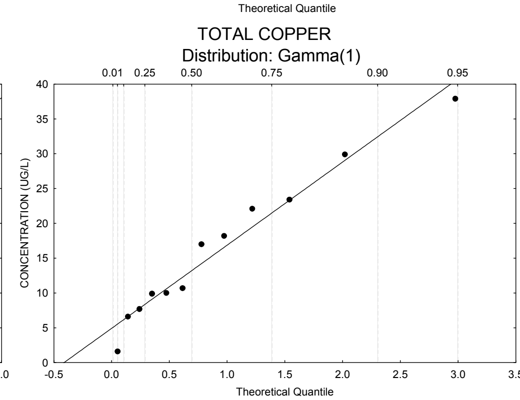

TOTAL CHROMIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

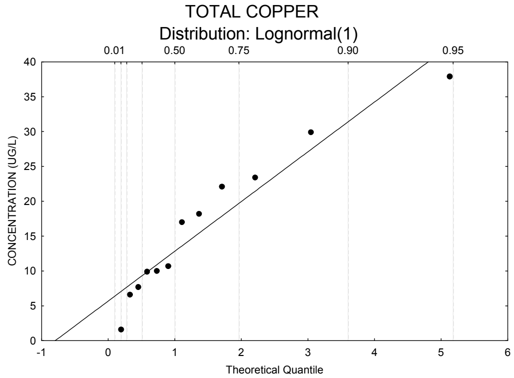

TOTAL COBALT
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

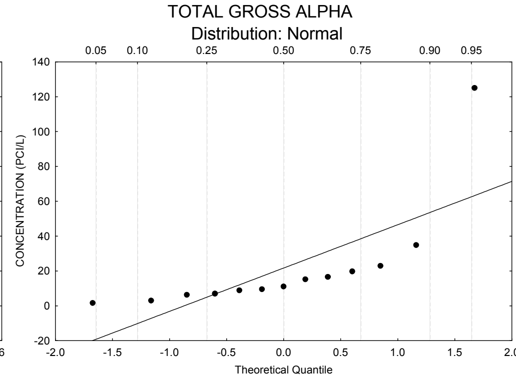

TOTAL COBALT
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

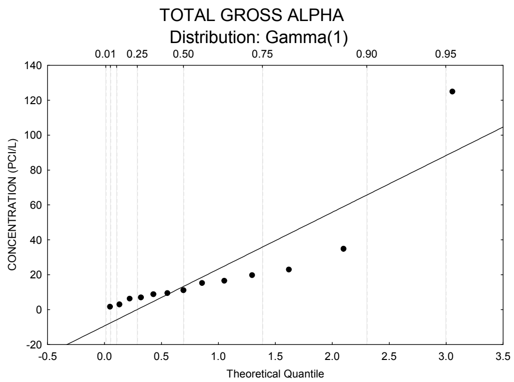

TOTAL COBALT
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

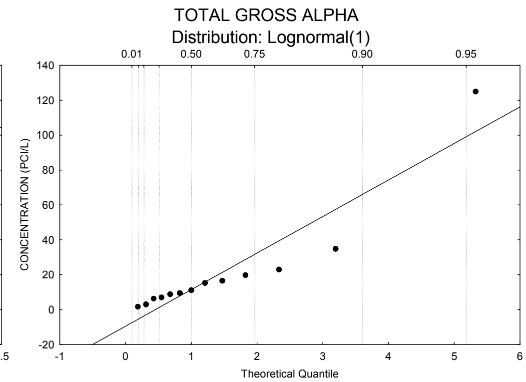

TOTAL COPPER
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

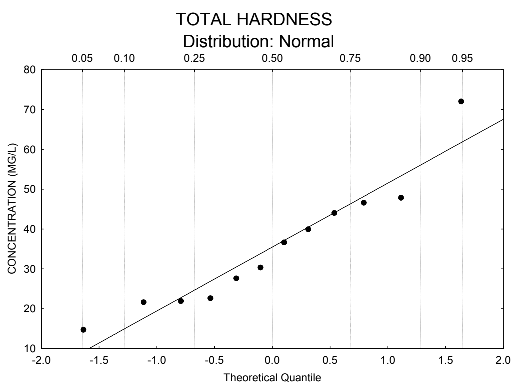

TOTAL COPPER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

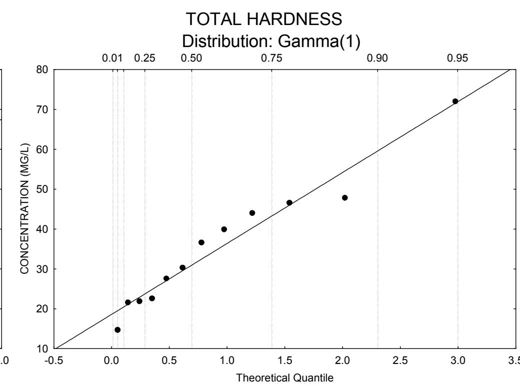

TOTAL COPPER
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

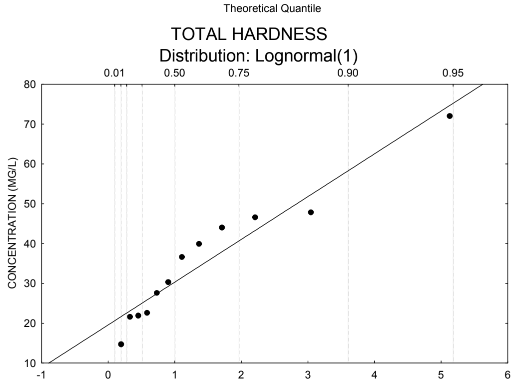

TOTAL GROSS ALPHA
Distribution: Normal
CONCENTRATION (PCI/L)
Theoretical Quantile

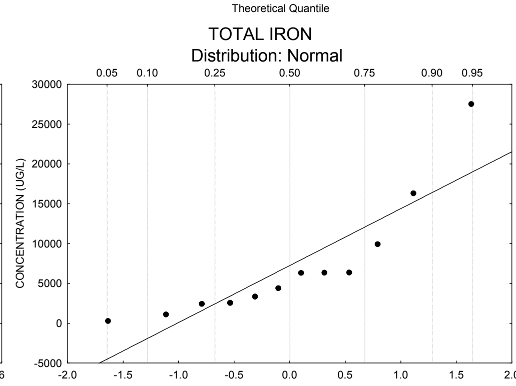

TOTAL GROSS ALPHA
Distribution: Gamma(1)
CONCENTRATION (PCI/L)
Theoretical Quantile

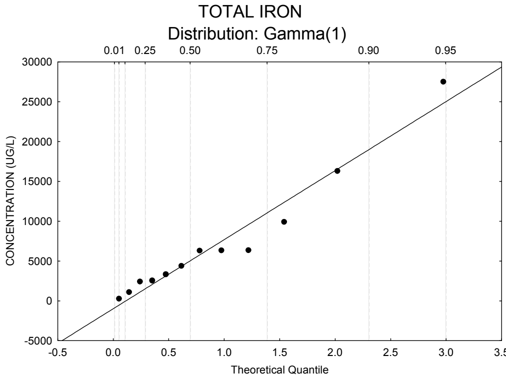

TOTAL GROSS ALPHA
Distribution: Lognormal(1)
CONCENTRATION (PCI/L)
Theoretical Quantile

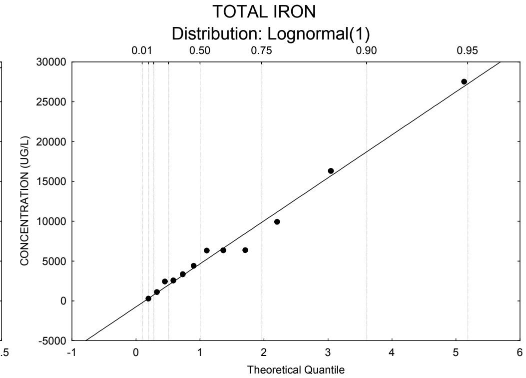

TOTAL HARDNESS
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

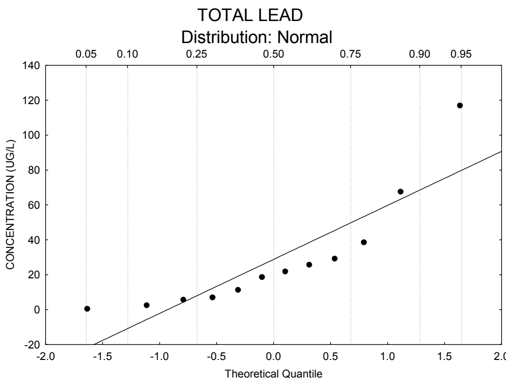

TOTAL HARDNESS
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

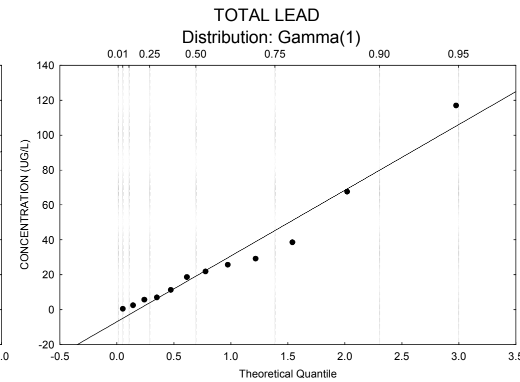

TOTAL HARDNESS
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

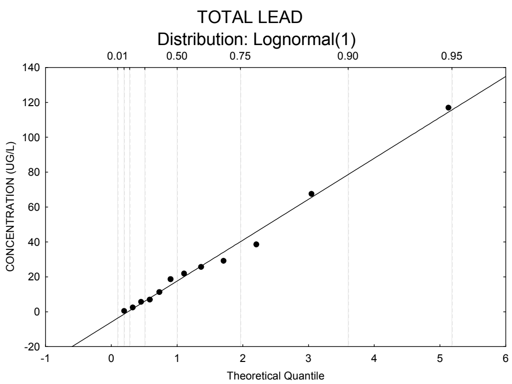

TOTAL IRON
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

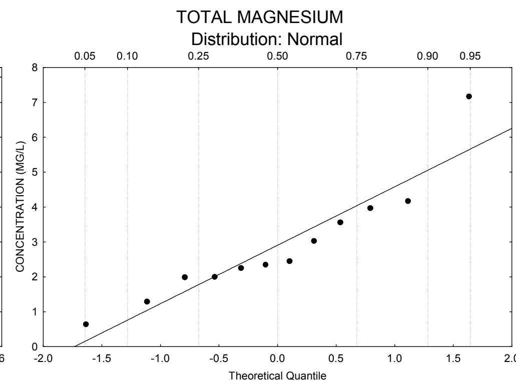

TOTAL IRON
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

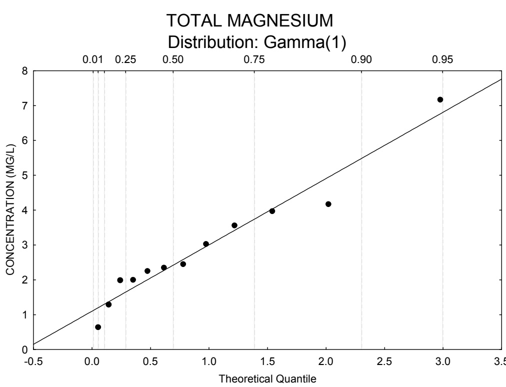

TOTAL IRON
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

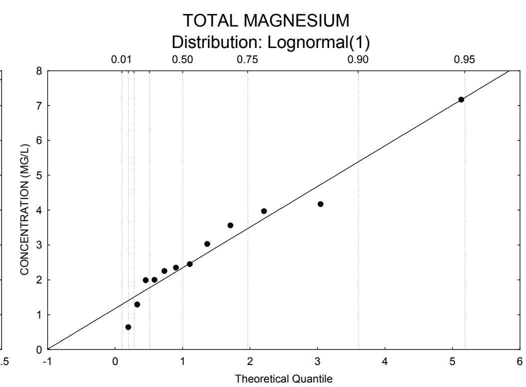

TOTAL LEAD
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

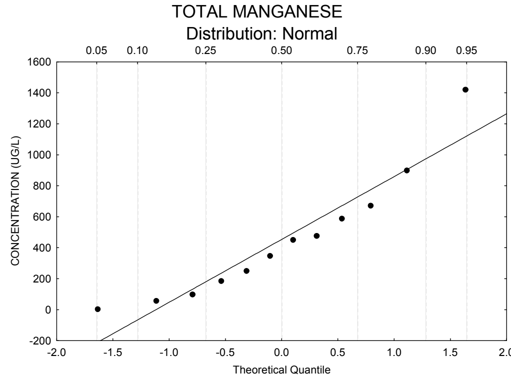

TOTAL LEAD
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

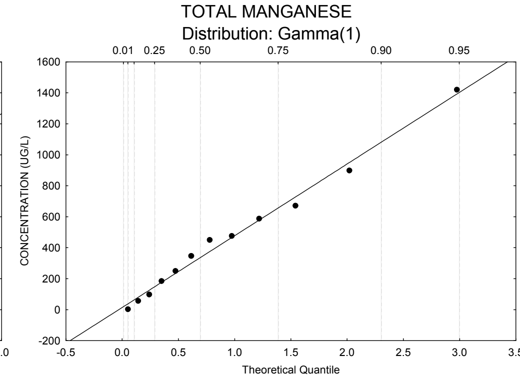

TOTAL LEAD
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

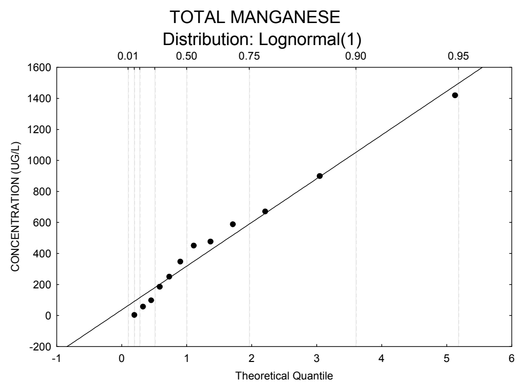

TOTAL MAGNESIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

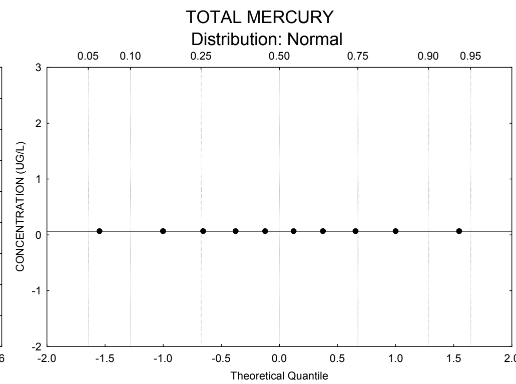

TOTAL MAGNESIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

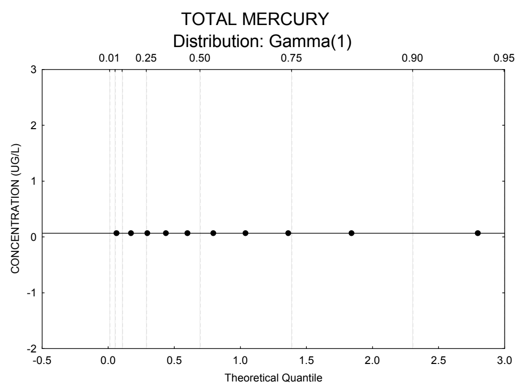

TOTAL MAGNESIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

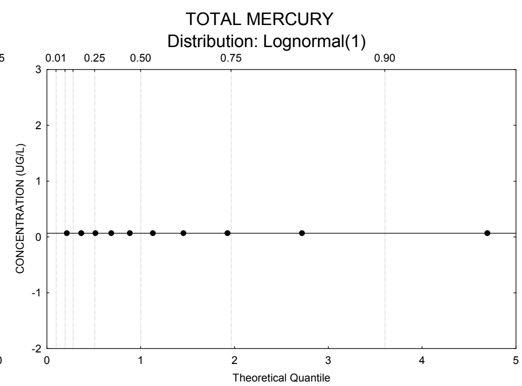

TOTAL MANGANESE
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

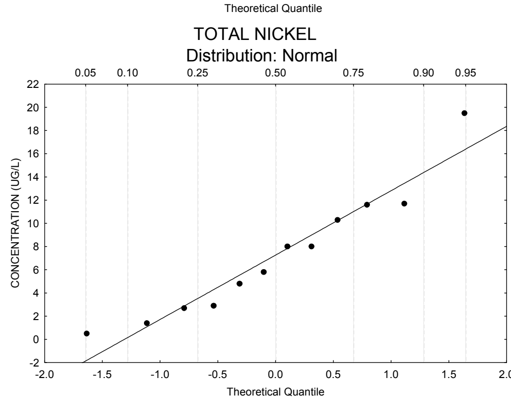

TOTAL MANGANESE
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

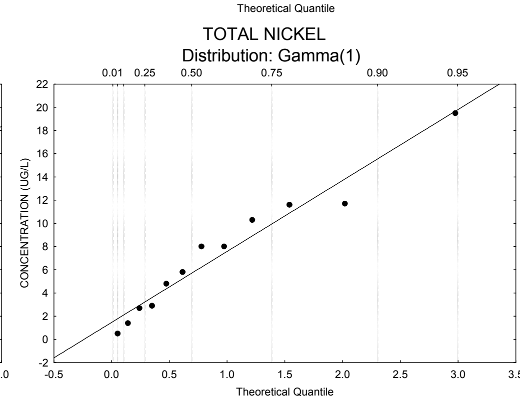

TOTAL MANGANESE
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL MERCURY
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

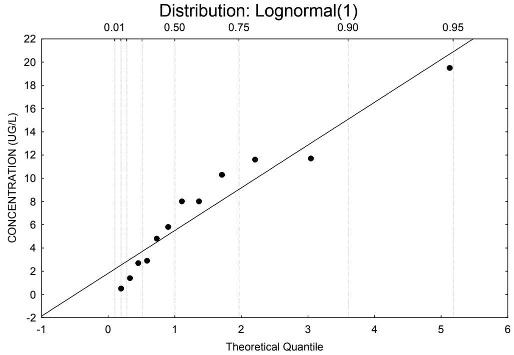

TOTAL MERCURY
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL MERCURY
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

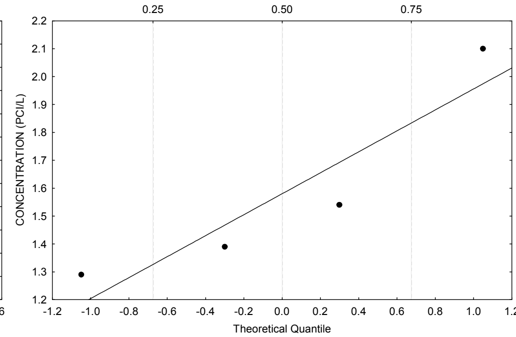

TOTAL NICKEL
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL NICKEL
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

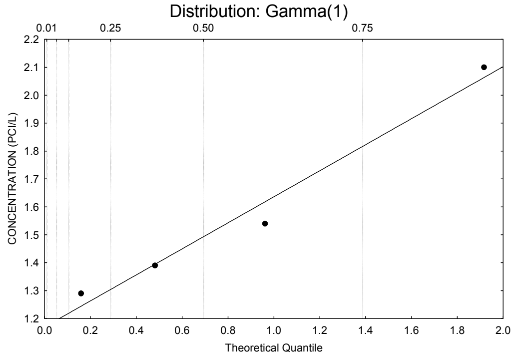
TOTAL NICKEL
Distribution: Lognormal(1)



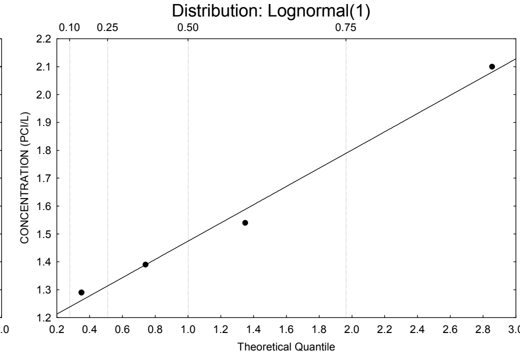
TOTAL RADIUM-226 AND -228
Distribution: Normal



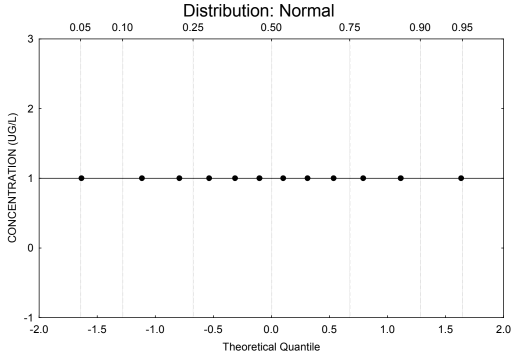
TOTAL RADIUM-226 AND -228
Distribution: Gamma(1)



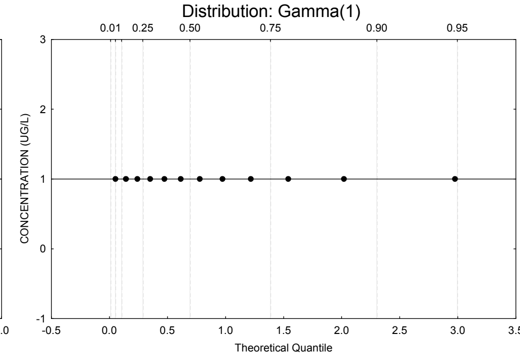
TOTAL RADIUM-226 AND -228
Distribution: Lognormal(1)



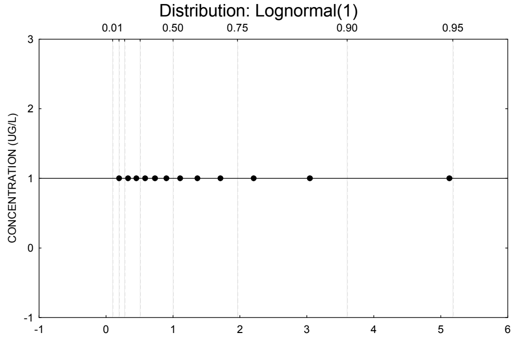
TOTAL SELENIUM
Distribution: Normal



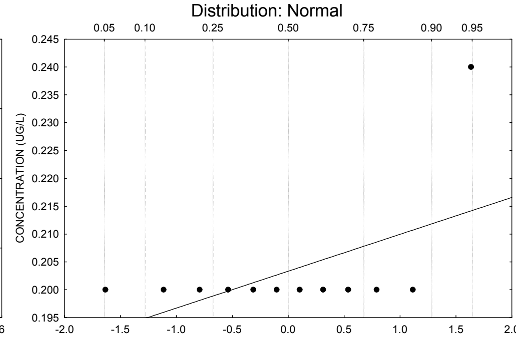
TOTAL SELENIUM
Distribution: Gamma(1)

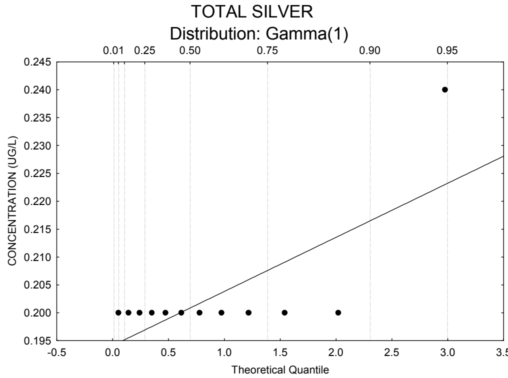


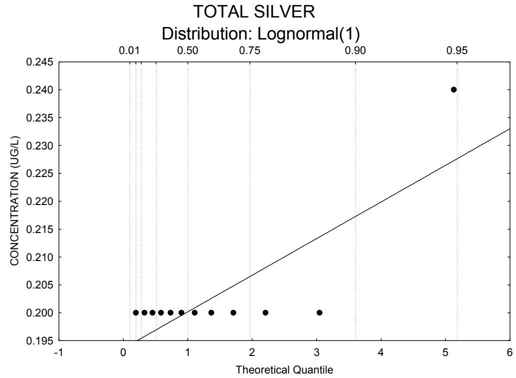
TOTAL SELENIUM
Distribution: Lognormal(1)

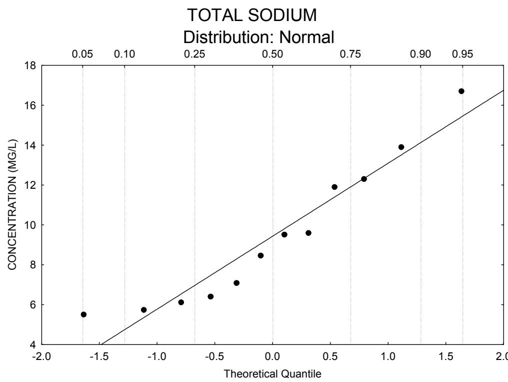


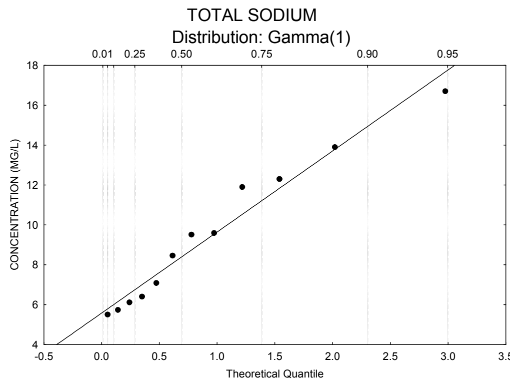
TOTAL SILVER
Distribution: Normal

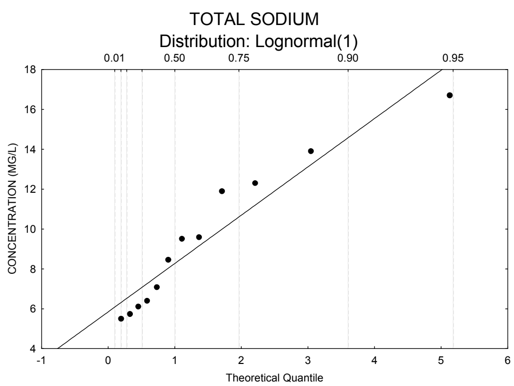


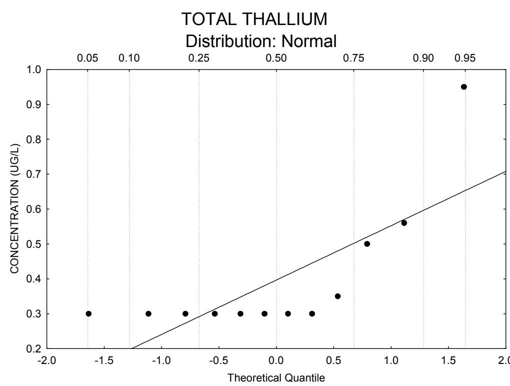

TOTAL SILVER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

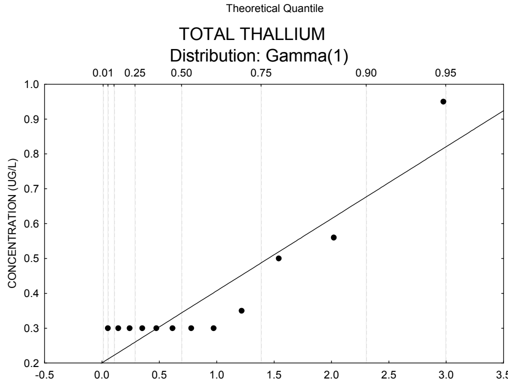

TOTAL SILVER
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

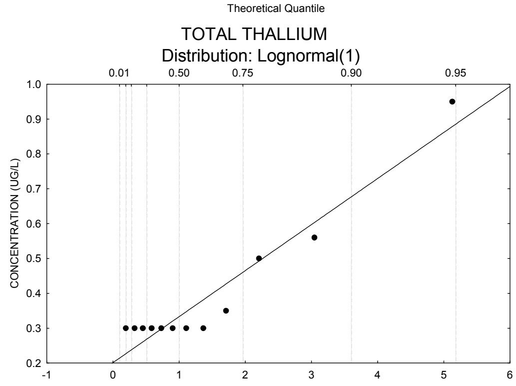

TOTAL SODIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

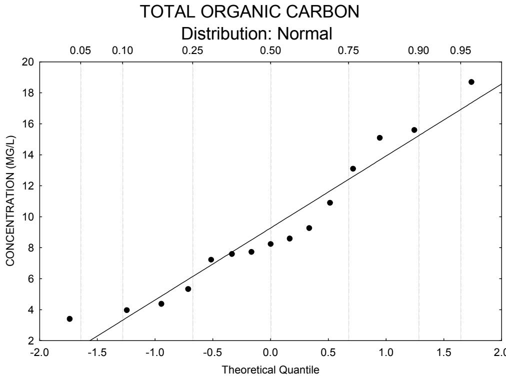

TOTAL SODIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

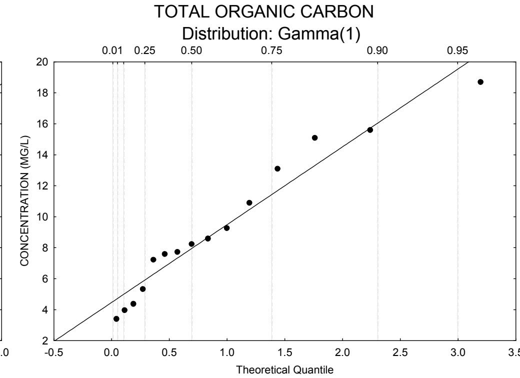

TOTAL SODIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

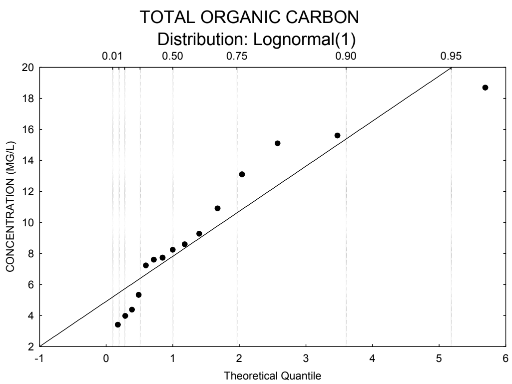

TOTAL THALLIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

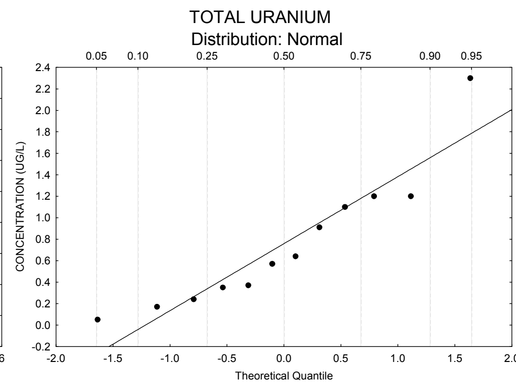

TOTAL THALLIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

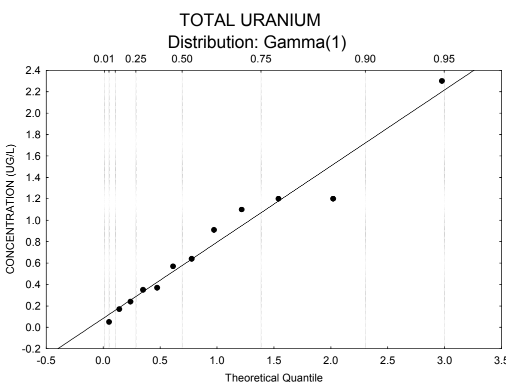

TOTAL THALLIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

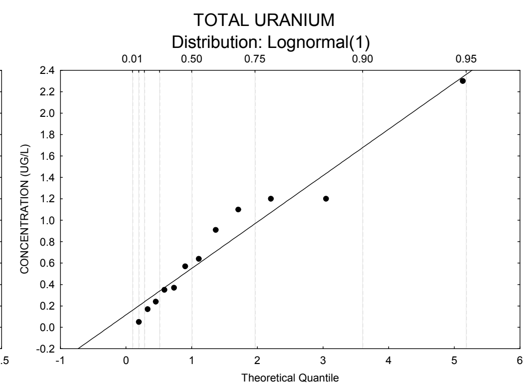

TOTAL ORGANIC CARBON
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (MG/L)
Theoretical Quantile

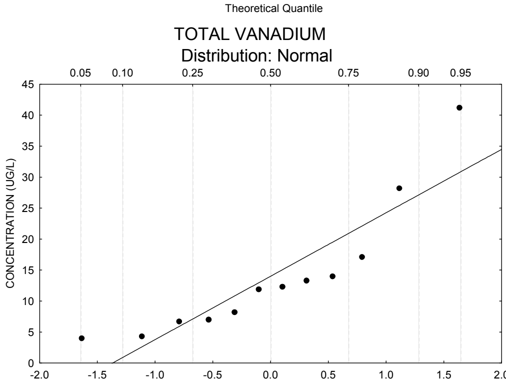

TOTAL ORGANIC CARBON
Distribution: Gamma(1)
0.01 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (MG/L)
Theoretical Quantile

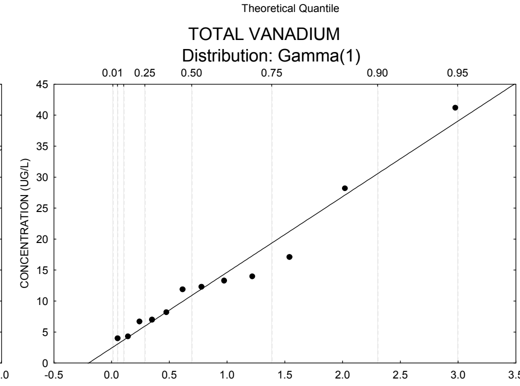

TOTAL ORGANIC CARBON
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (MG/L)
Theoretical Quantile

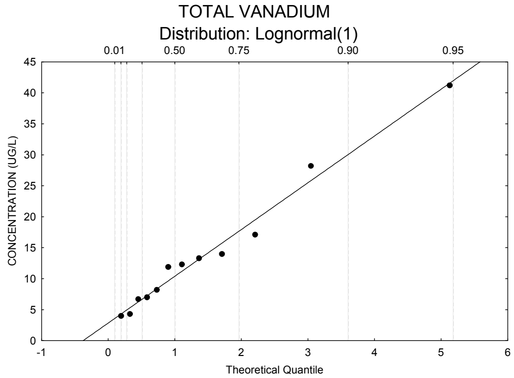

TOTAL URANIUM
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

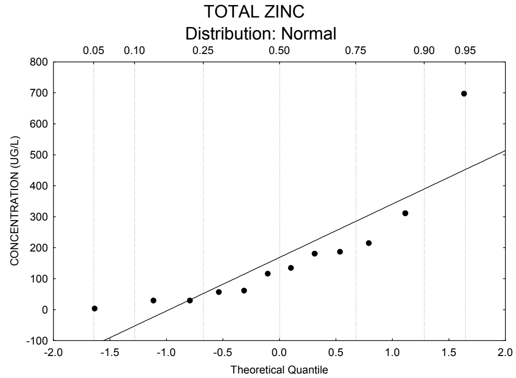

TOTAL URANIUM
Distribution: Gamma(1)
0.01 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

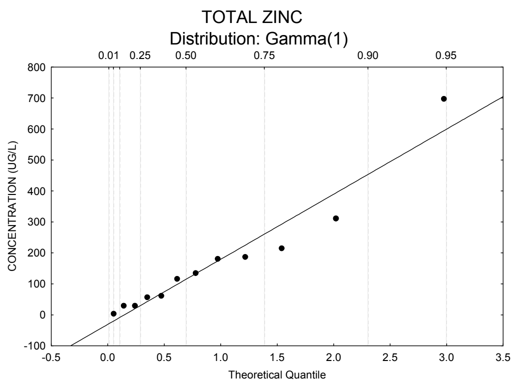

TOTAL URANIUM
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

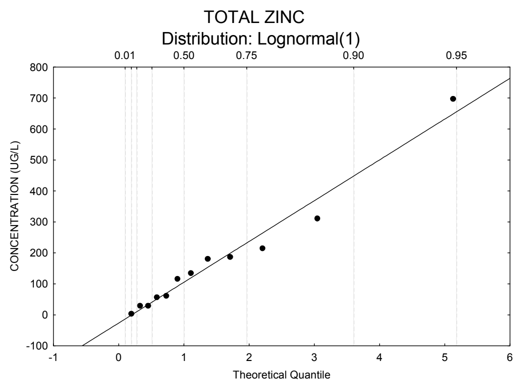

TOTAL VANADIUM
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL VANADIUM
Distribution: Gamma(1)
0.01 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

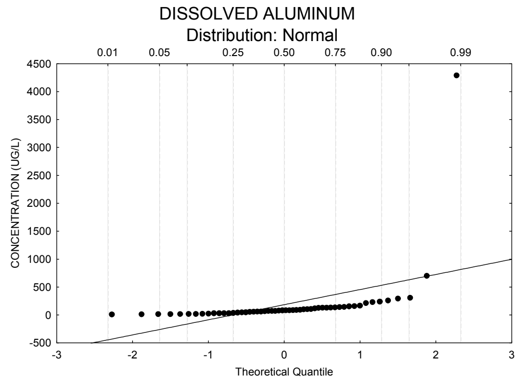

TOTAL VANADIUM
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

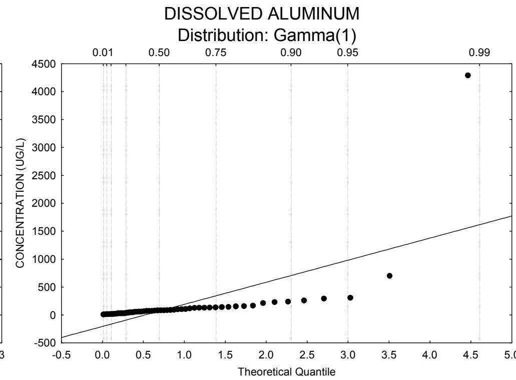

TOTAL ZINC
Distribution: Normal
0.05 0.10 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

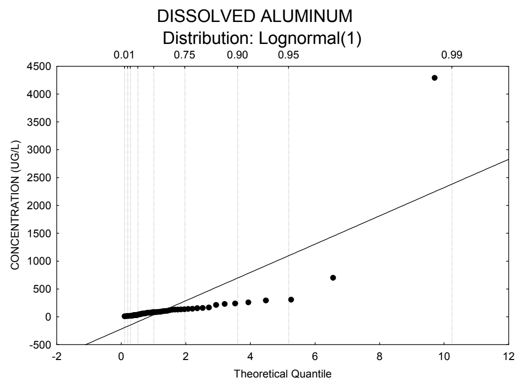

TOTAL ZINC
Distribution: Gamma(1)
0.01 0.25 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

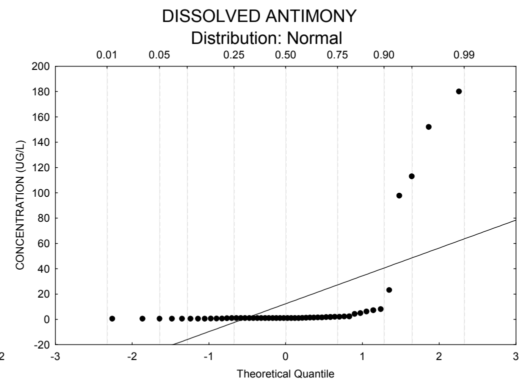

TOTAL ZINC
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

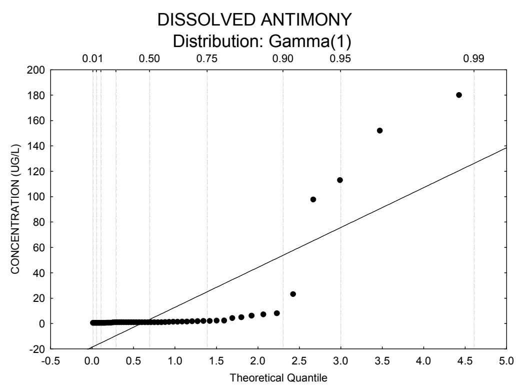
Urban Runon

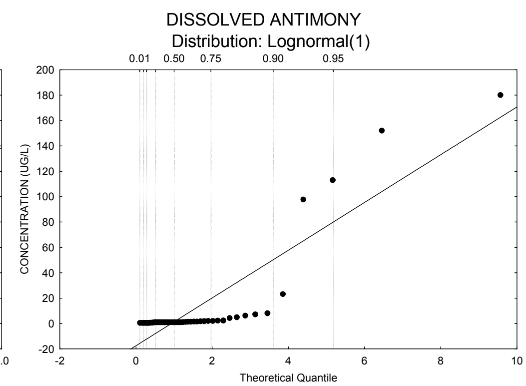

DISSOLVED ALUMINUM
Distribution: Normal
0.01 0.05 0.25 0.50 0.75 0.90 0.99
CONCENTRATION (UG/L)
Theoretical Quantile

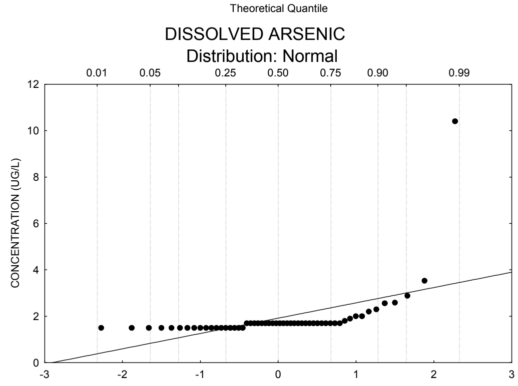

DISSOLVED ALUMINUM
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95 0.99
CONCENTRATION (UG/L)
Theoretical Quantile

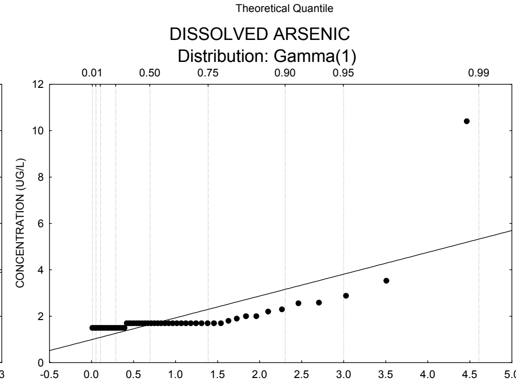

DISSOLVED ALUMINUM
Distribution: Lognormal(1)
0.01 0.75 0.90 0.95 0.99
CONCENTRATION (UG/L)
Theoretical Quantile


DISSOLVED ANTIMONY
Distribution: Normal
0.01 0.05 0.25 0.50 0.75 0.90 0.99
CONCENTRATION (UG/L)
Theoretical Quantile

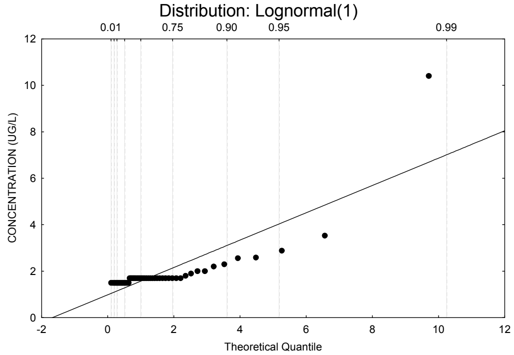

DISSOLVED ANTIMONY
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95 0.99
CONCENTRATION (UG/L)
Theoretical Quantile


DISSOLVED ANTIMONY
Distribution: Lognormal(1)
0.01 0.50 0.75 0.90 0.95
CONCENTRATION (UG/L)
Theoretical Quantile

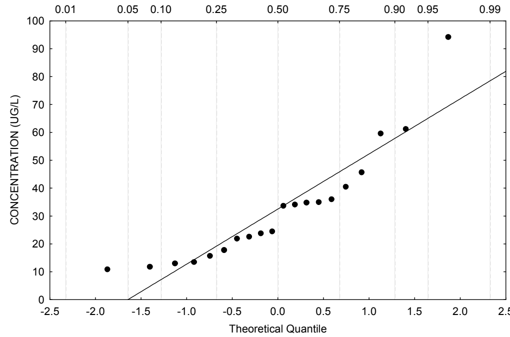

DISSOLVED ARSENIC
Distribution: Normal
0.01 0.05 0.25 0.50 0.75 0.90 0.99
CONCENTRATION (UG/L)
Theoretical Quantile


DISSOLVED ARSENIC
Distribution: Gamma(1)
0.01 0.50 0.75 0.90 0.95 0.99
CONCENTRATION (UG/L)
Theoretical Quantile

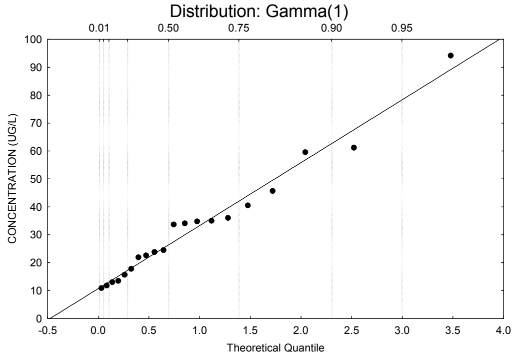
DISSOLVED ARSENIC
Distribution: Lognormal(1)



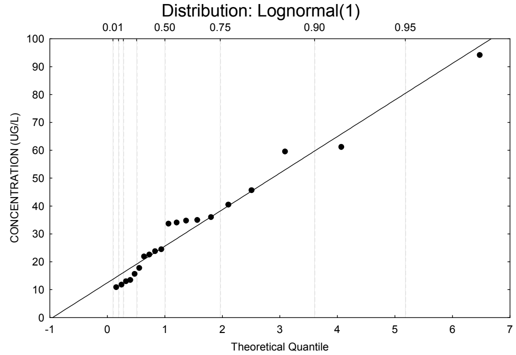
DISSOLVED BARIUM
Distribution: Normal



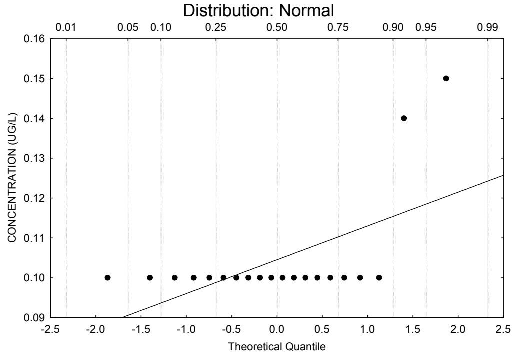
DISSOLVED BARIUM
Distribution: Gamma(1)



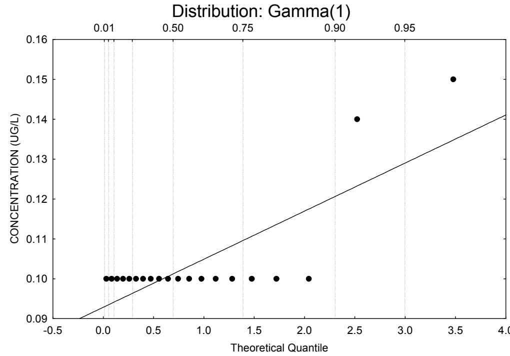
DISSOLVED BARIUM
Distribution: Lognormal(1)



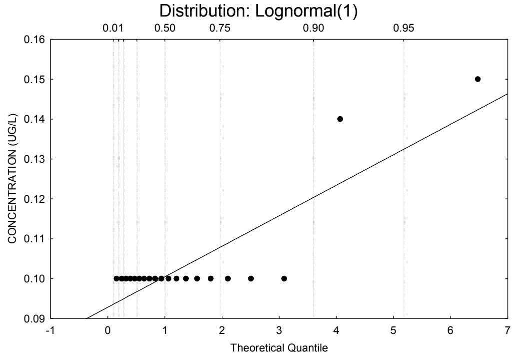
DISSOLVED BERYLLIUM
Distribution: Normal



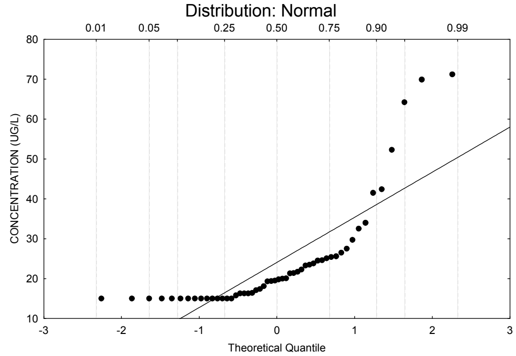
DISSOLVED BERYLLIUM
Distribution: Gamma(1)

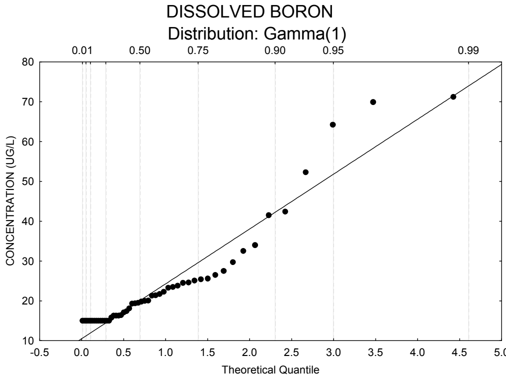


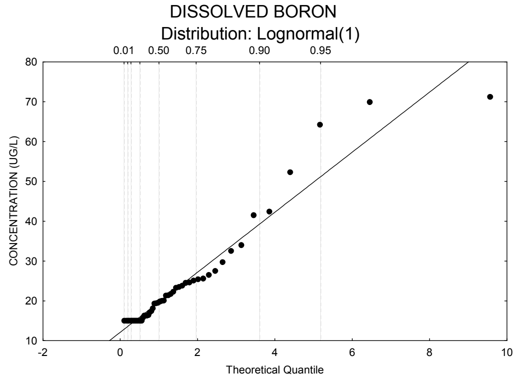
DISSOLVED BERYLLIUM
Distribution: Lognormal(1)

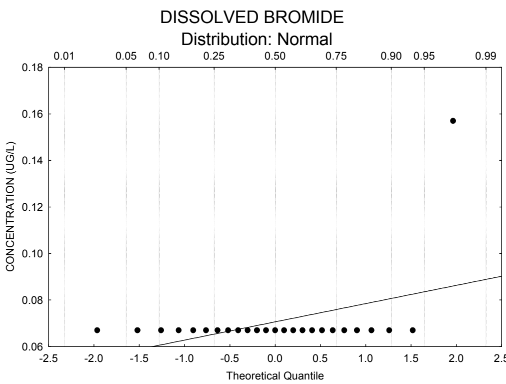


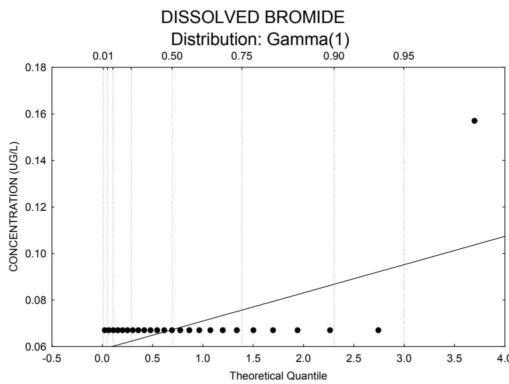
DISSOLVED BORON
Distribution: Normal

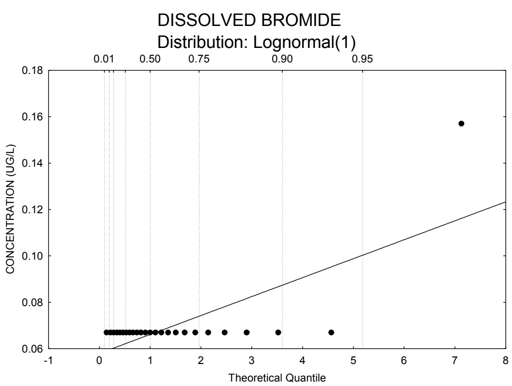


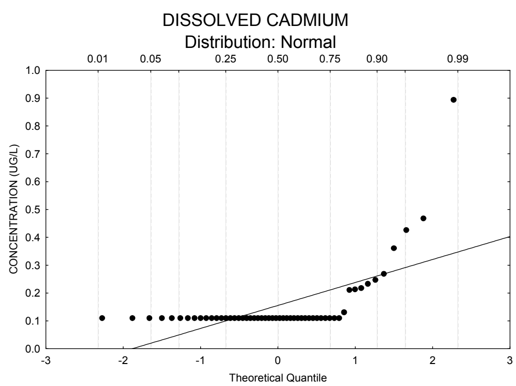

DISSOLVED BORON
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

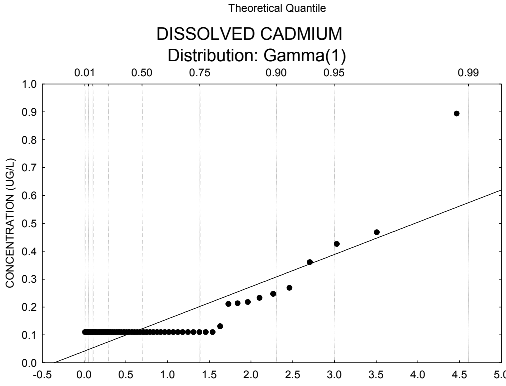

DISSOLVED BORON
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

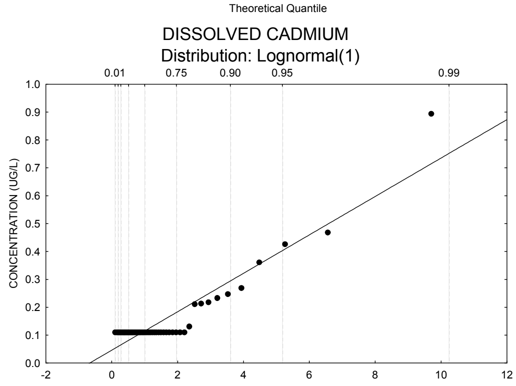

DISSOLVED BROMIDE
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

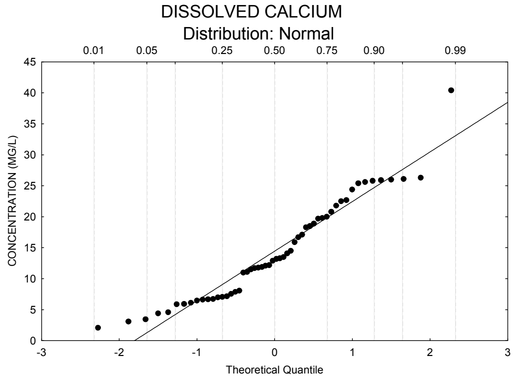

DISSOLVED BROMIDE
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

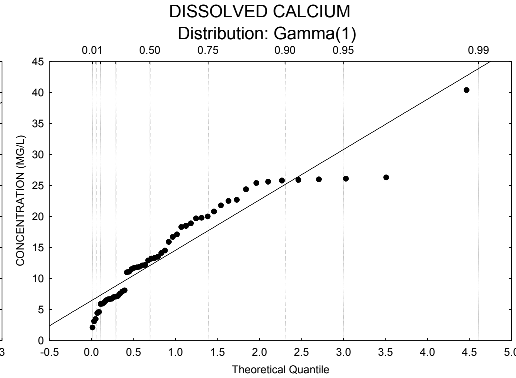

DISSOLVED BROMIDE
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

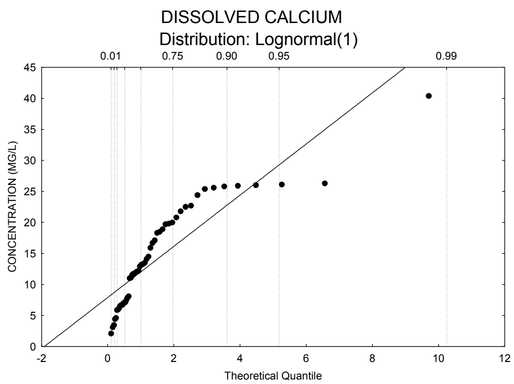

DISSOLVED CADMIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

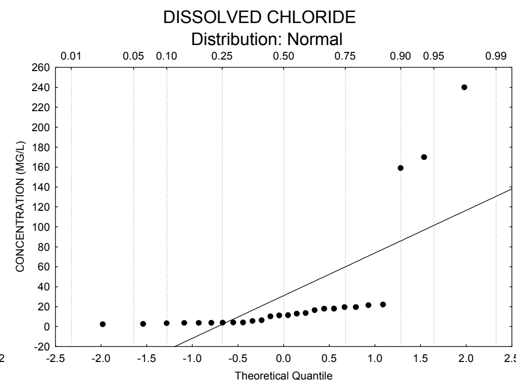

DISSOLVED CADMIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

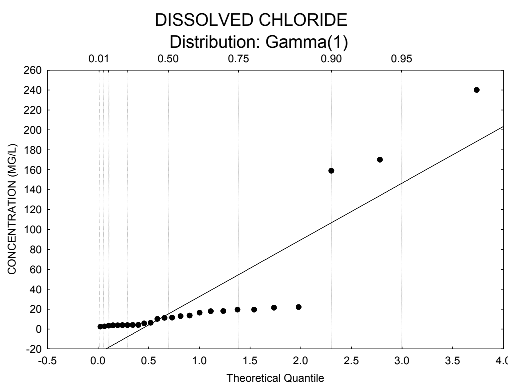

DISSOLVED CADMIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

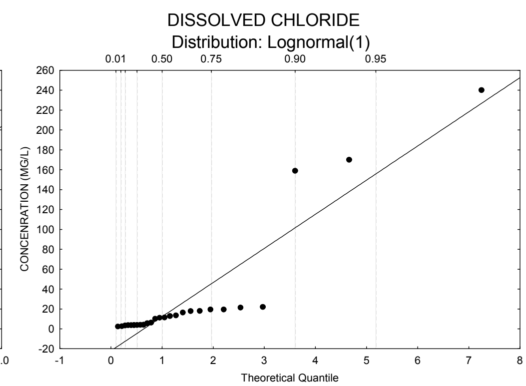

DISSOLVED CALCIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

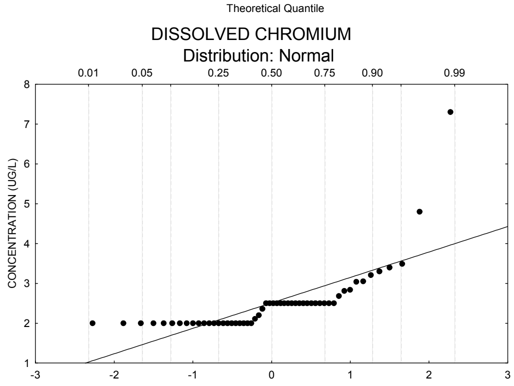

DISSOLVED CALCIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

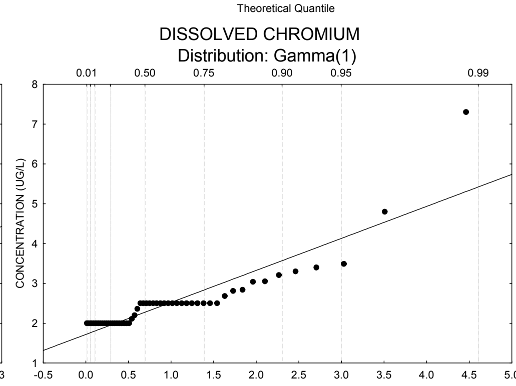

DISSOLVED CALCIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

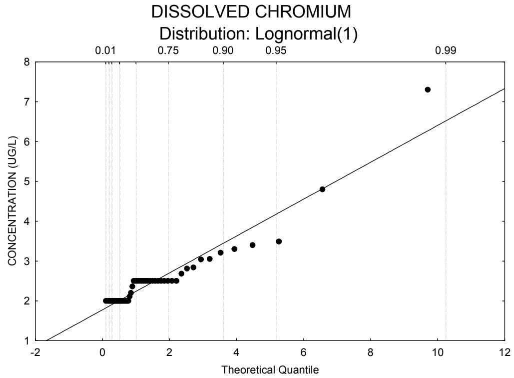

DISSOLVED CHLORIDE
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

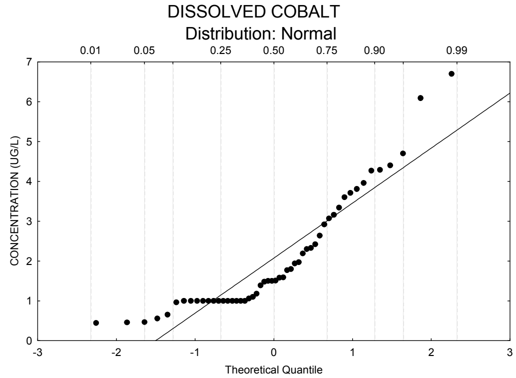

DISSOLVED CHLORIDE
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

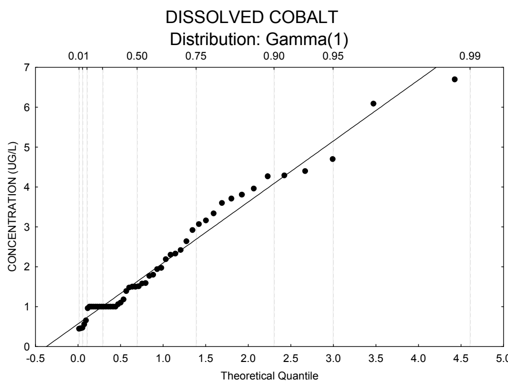

DISSOLVED CHLORIDE
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

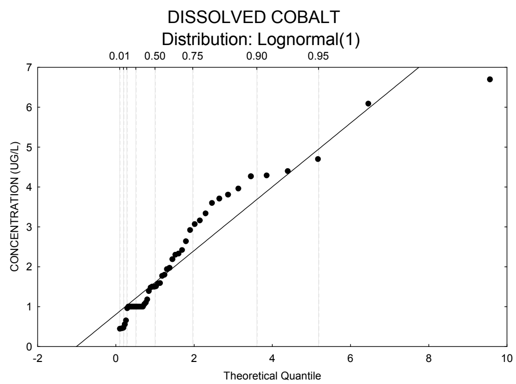

DISSOLVED CHROMIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

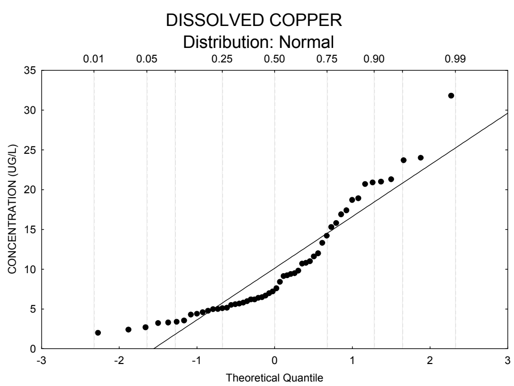

DISSOLVED CHROMIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

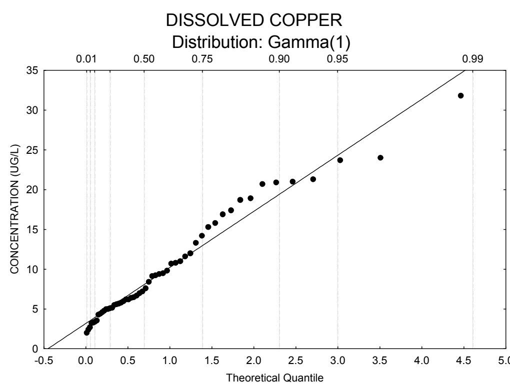

DISSOLVED CHROMIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

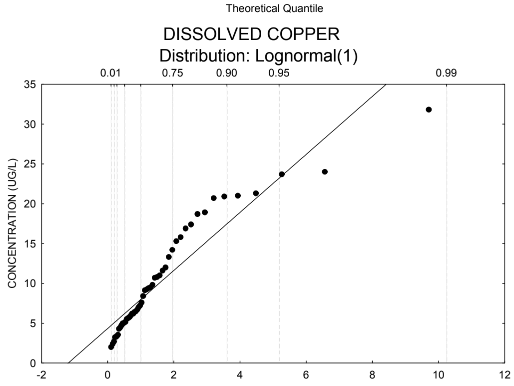

DISSOLVED COBALT
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

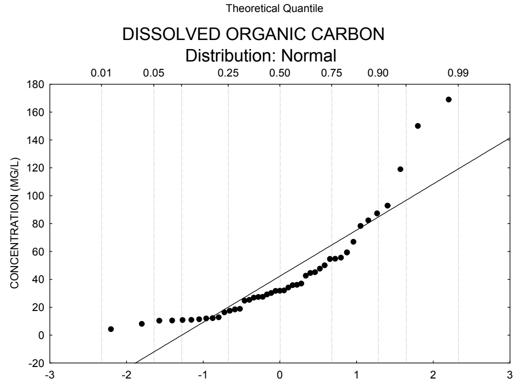

DISSOLVED COBALT
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

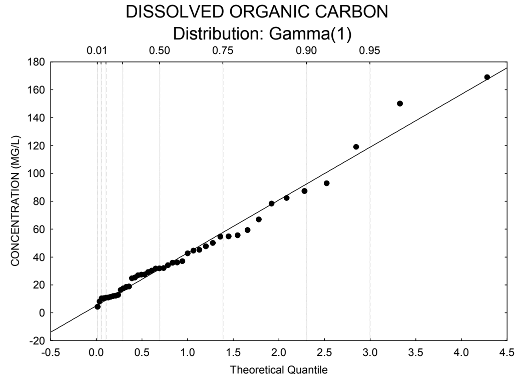

DISSOLVED COBALT
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

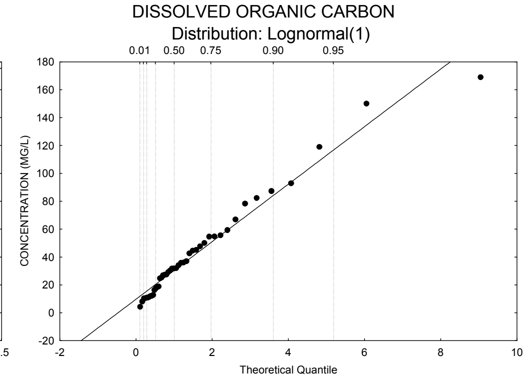

DISSOLVED COPPER
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

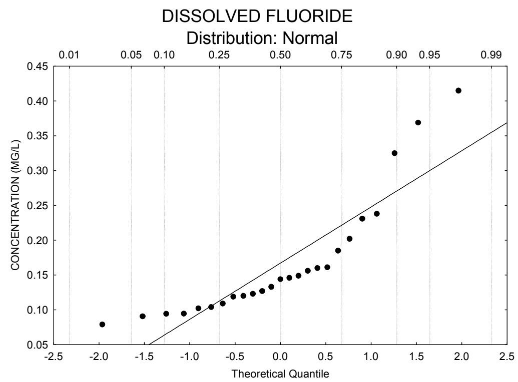

DISSOLVED COPPER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

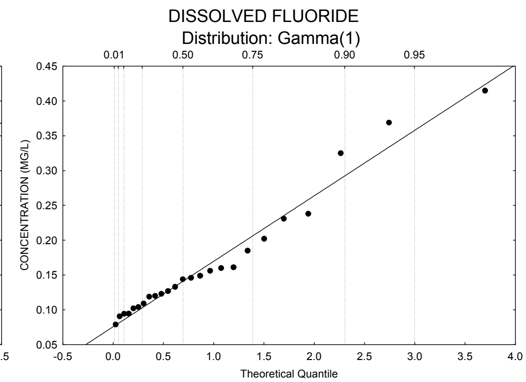

DISSOLVED COPPER
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

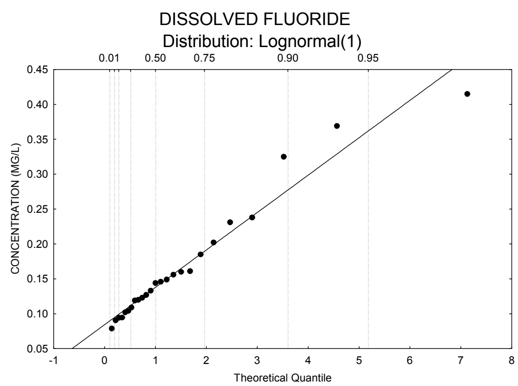

DISSOLVED ORGANIC CARBON
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

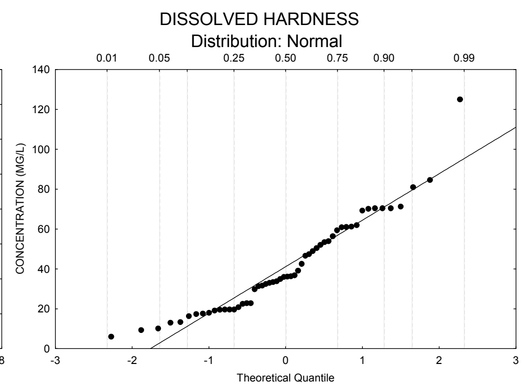

DISSOLVED ORGANIC CARBON
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

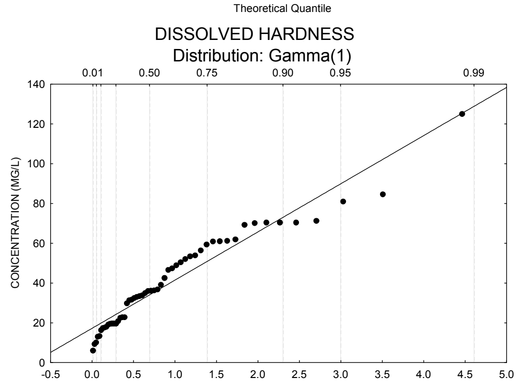

DISSOLVED ORGANIC CARBON
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

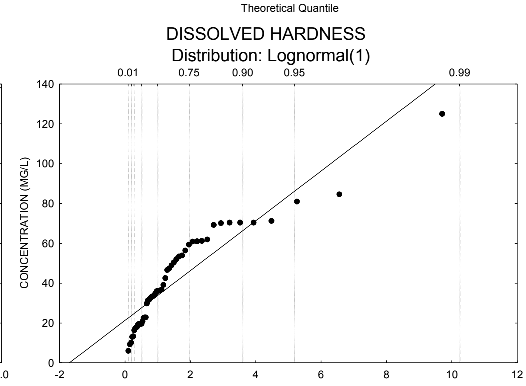

DISSOLVED FLUORIDE
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

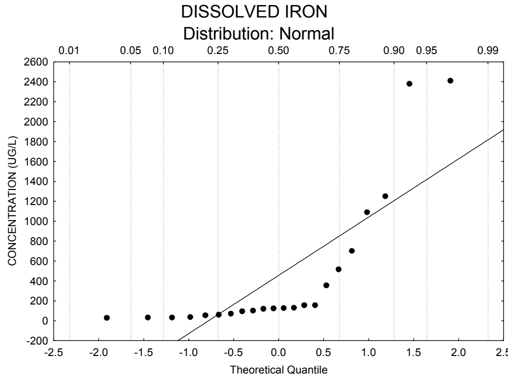

DISSOLVED FLUORIDE
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

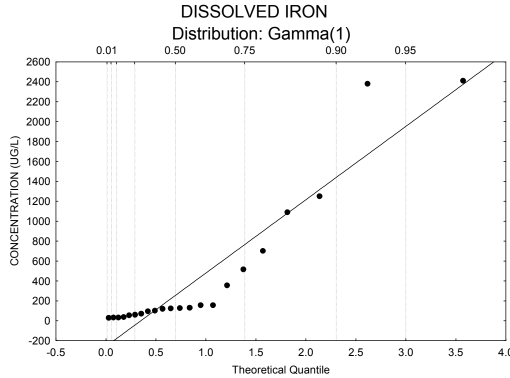

DISSOLVED FLUORIDE
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

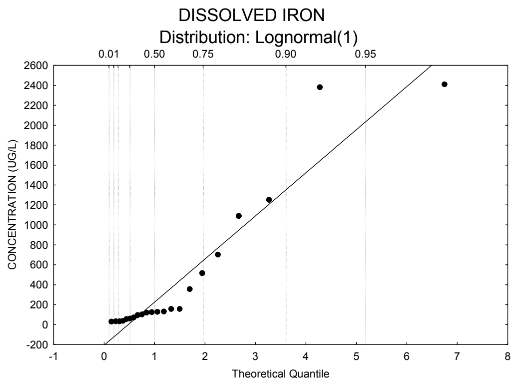

DISSOLVED HARDNESS
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

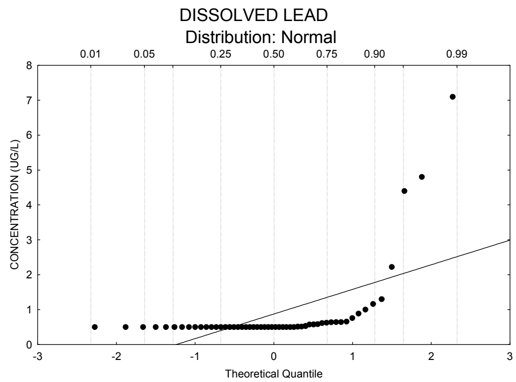

DISSOLVED HARDNESS
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

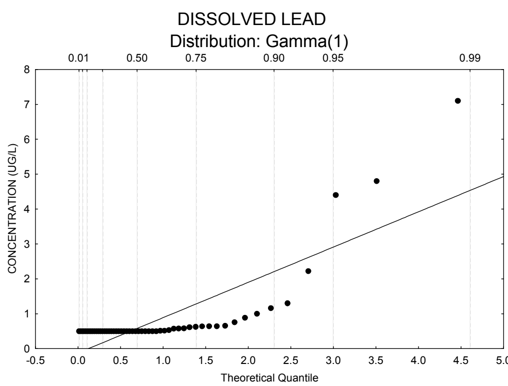

DISSOLVED HARDNESS
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

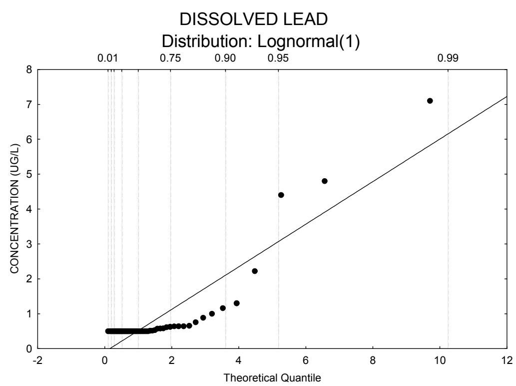

DISSOLVED IRON
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

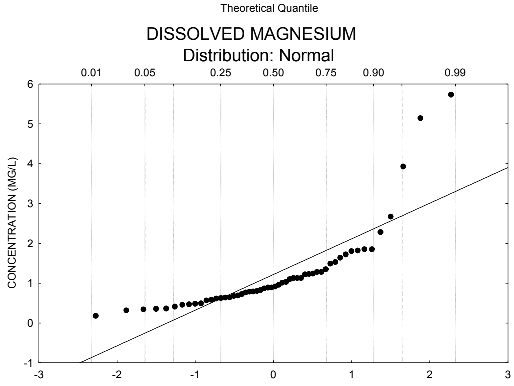

DISSOLVED IRON
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

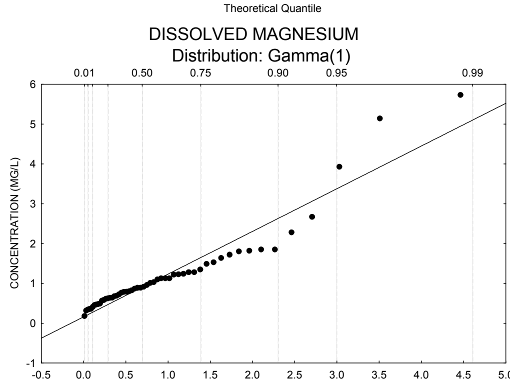

DISSOLVED IRON
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

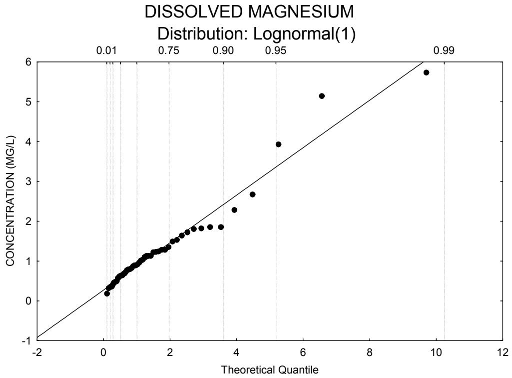

DISSOLVED LEAD
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

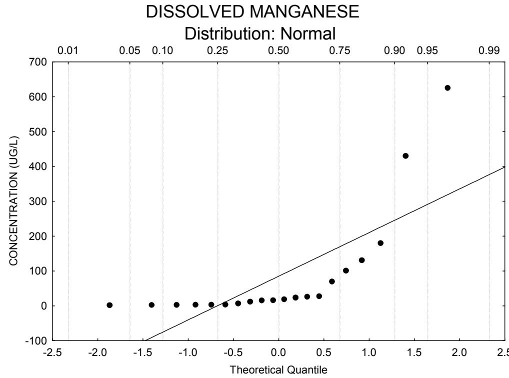

DISSOLVED LEAD
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

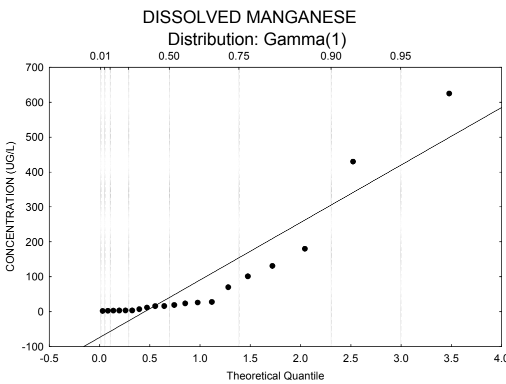

DISSOLVED LEAD
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

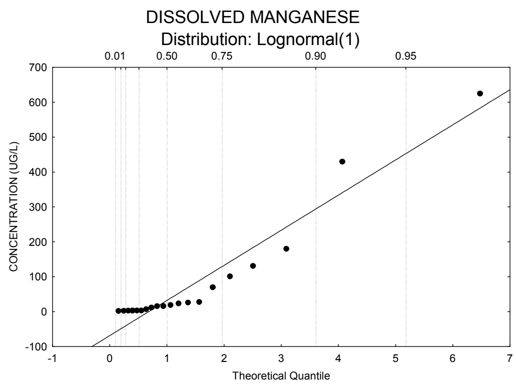

DISSOLVED MAGNESIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

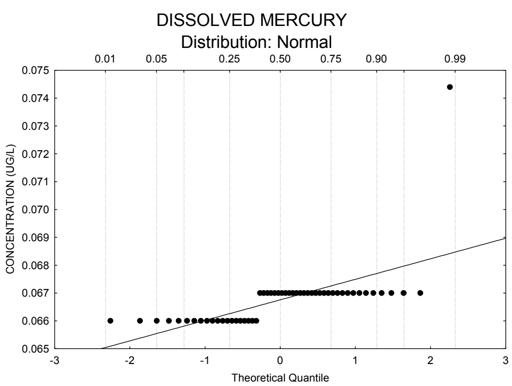

DISSOLVED MAGNESIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

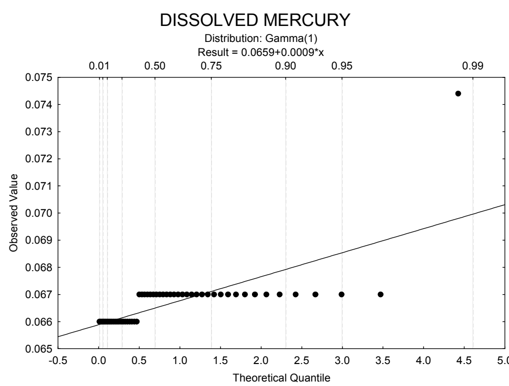

DISSOLVED MAGNESIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

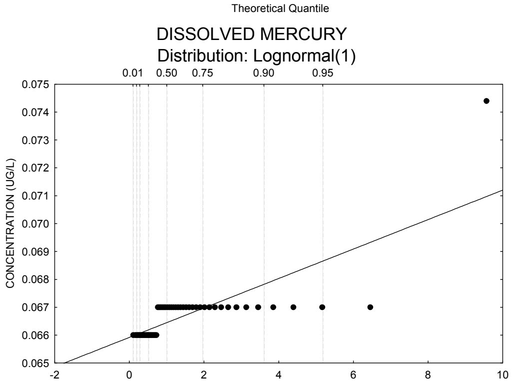

DISSOLVED MANGANESE
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

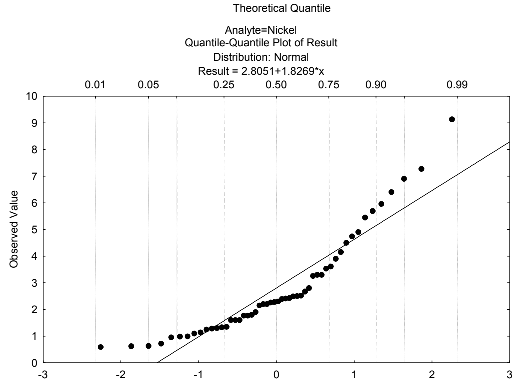

DISSOLVED MANGANESE
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

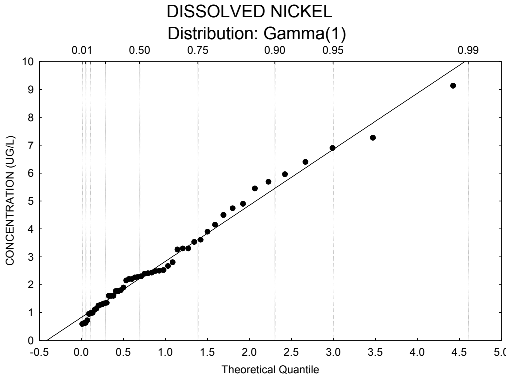

DISSOLVED MANGANESE
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

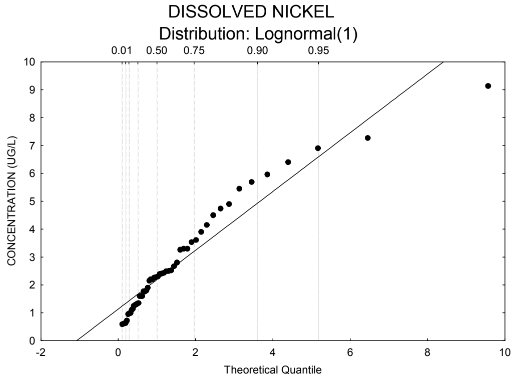

DISSOLVED MERCURY
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

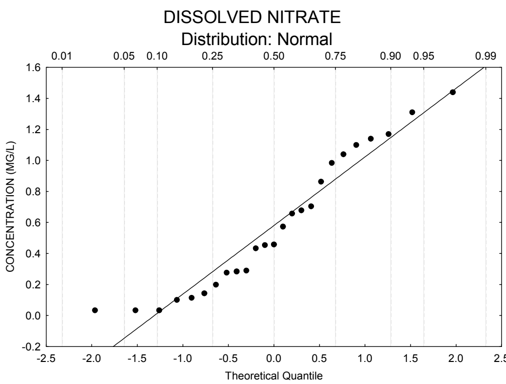

DISSOLVED MERCURY
Distribution: Gamma(1)
Result = 0.0659+0.0009*x
Observed Value
Theoretical Quantile

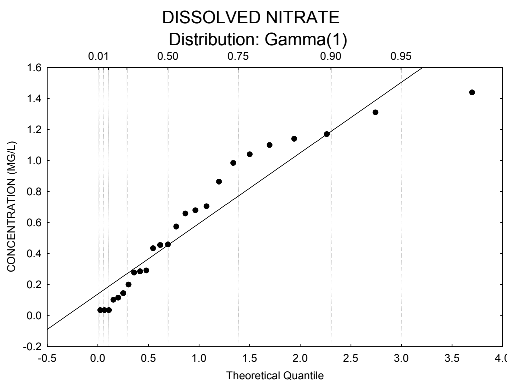

DISSOLVED MERCURY
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

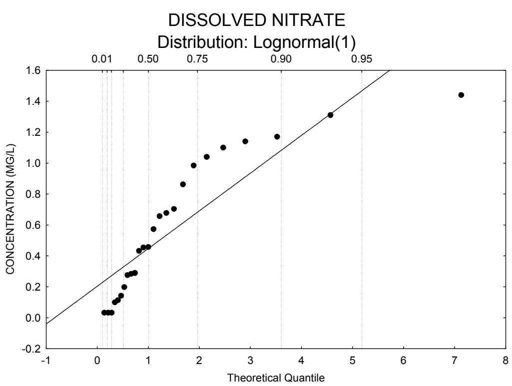

Analyte=Nickel
Quantile-Quantile Plot of Result
Distribution: Normal
Result = 2.8051+1.8269*x
Observed Value
Theoretical Quantile

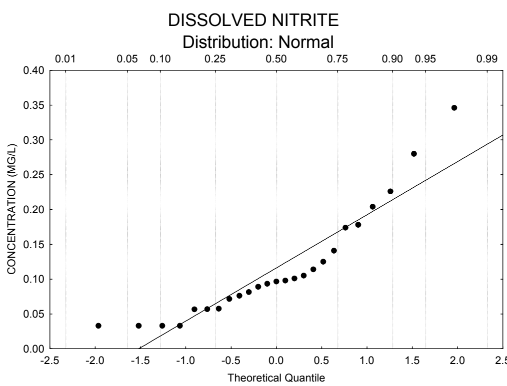

DISSOLVED NICKEL
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

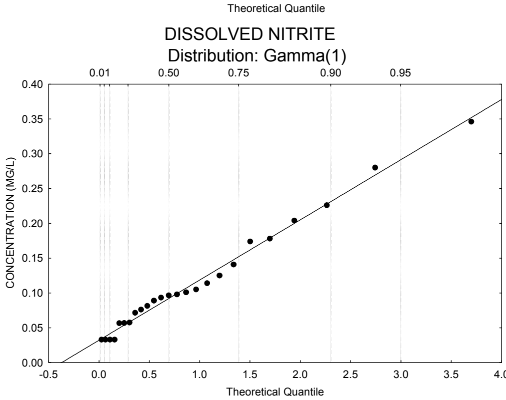

DISSOLVED NICKEL
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

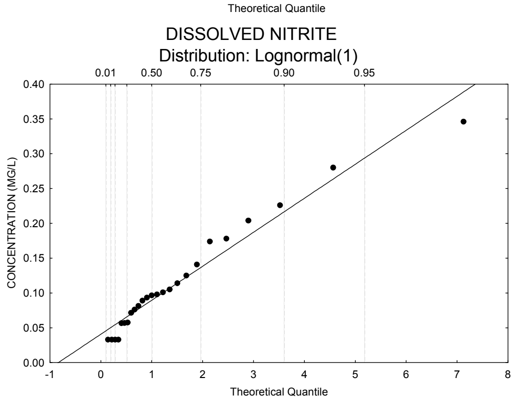

DISSOLVED NITRATE
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

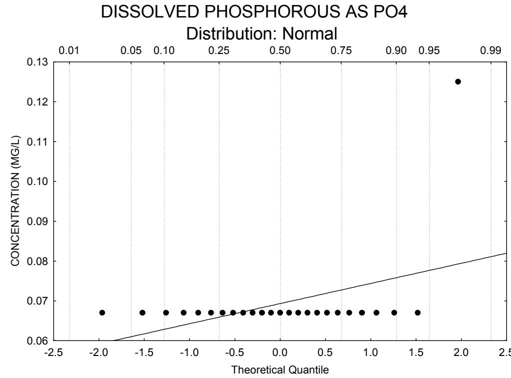

DISSOLVED NITRATE
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

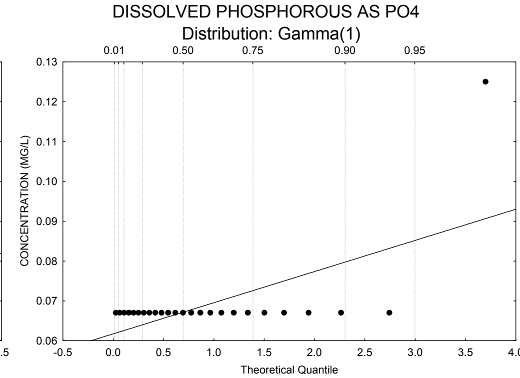

DISSOLVED NITRATE
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

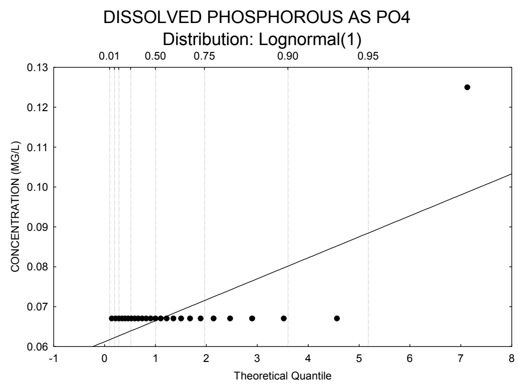

DISSOLVED NITRITE
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

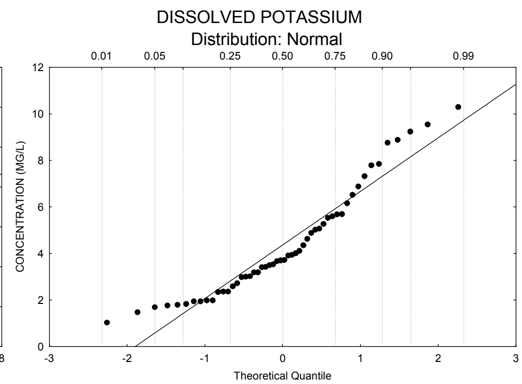

DISSOLVED NITRITE
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

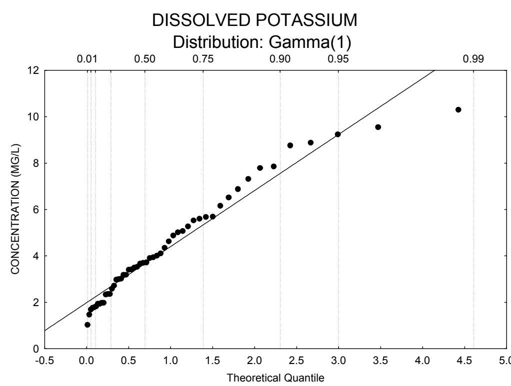

DISSOLVED NITRITE
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

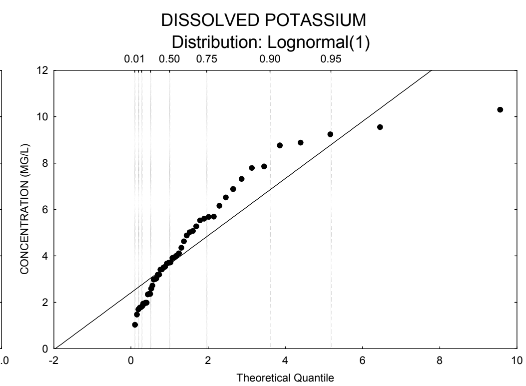

DISSOLVED PHOSPHOROUS AS PO4
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

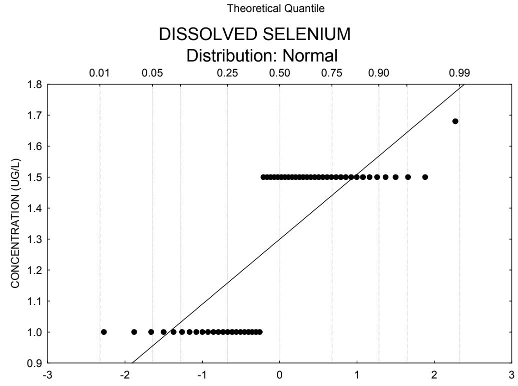

DISSOLVED PHOSPHOROUS AS PO4
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

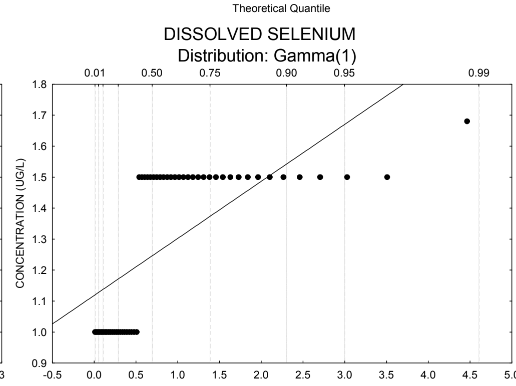

DISSOLVED PHOSPHOROUS AS PO4
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

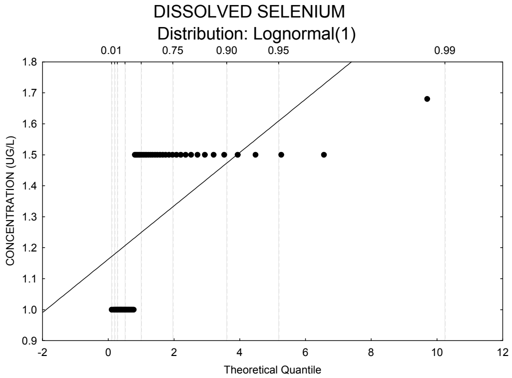

DISSOLVED POTASSIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

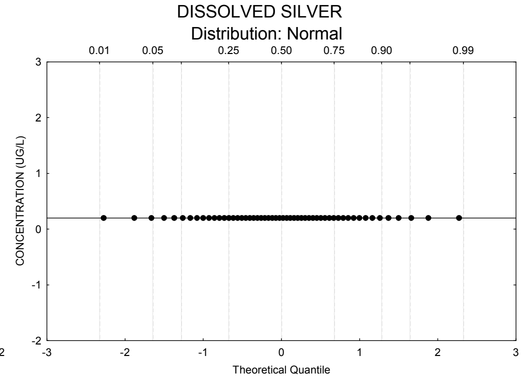

DISSOLVED POTASSIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

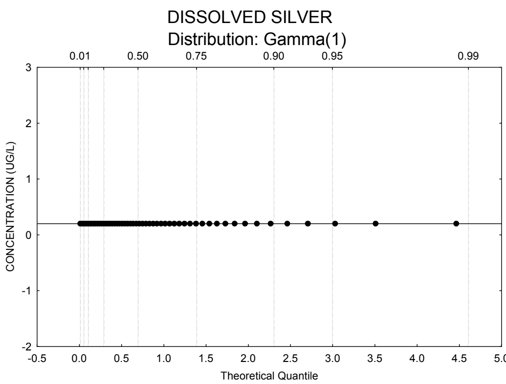

DISSOLVED POTASSIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

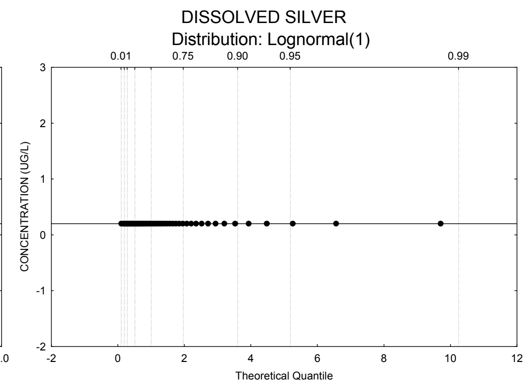

DISSOLVED SELENIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

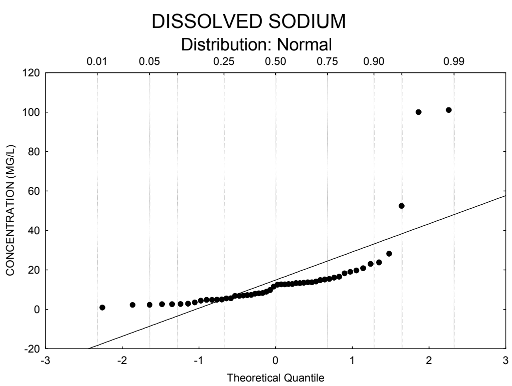

DISSOLVED SELENIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

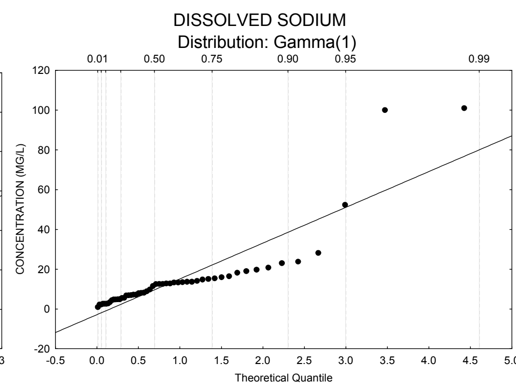

DISSOLVED SELENIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

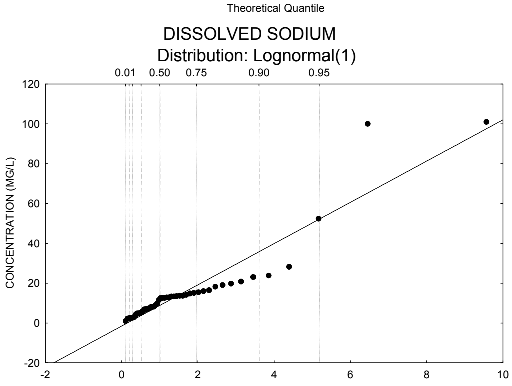

DISSOLVED SILVER
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

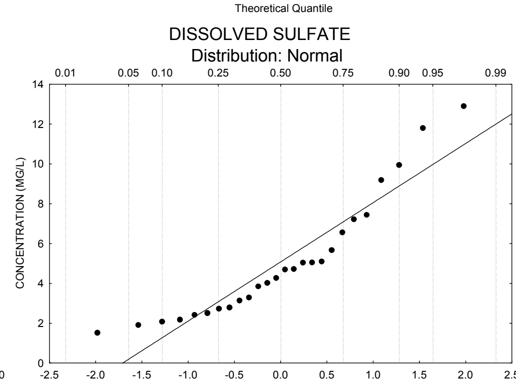

DISSOLVED SILVER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

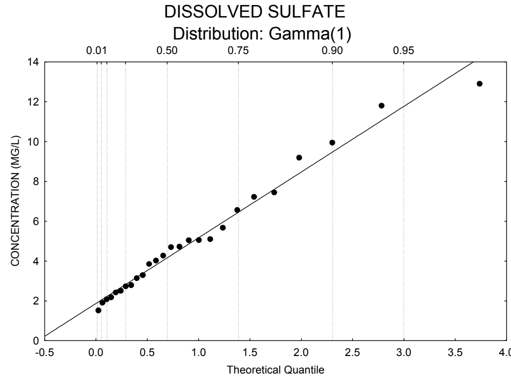

DISSOLVED SILVER
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

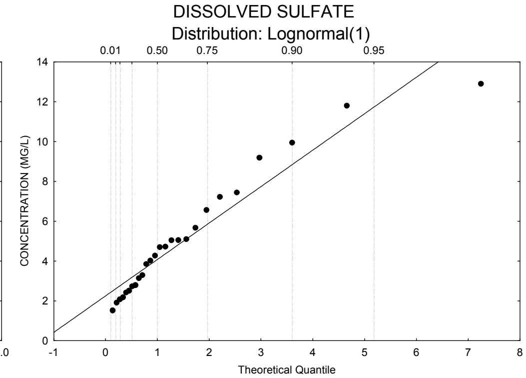

DISSOLVED SODIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

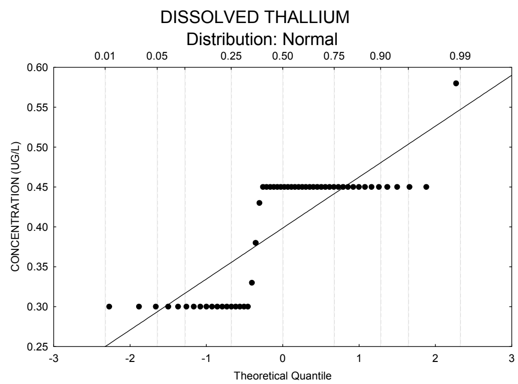

DISSOLVED SODIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

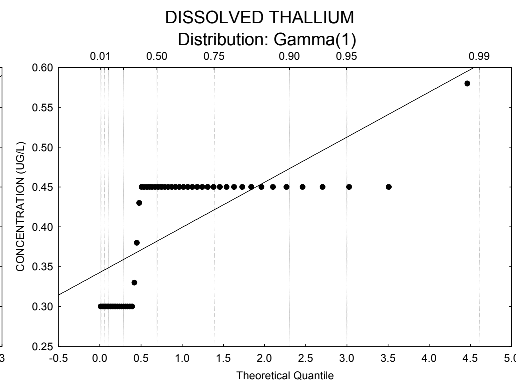

DISSOLVED SODIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

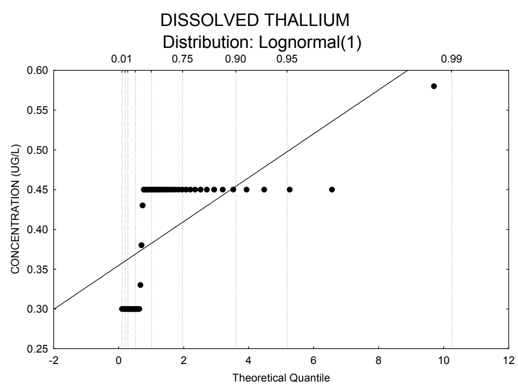

DISSOLVED SULFATE
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

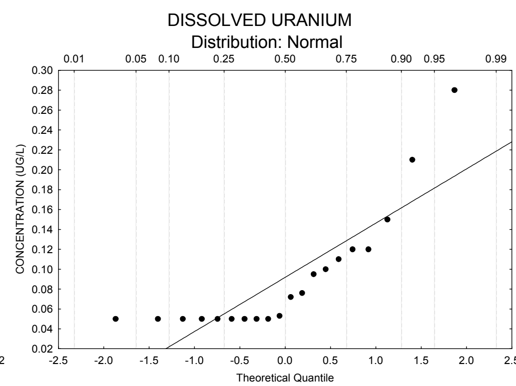

DISSOLVED SULFATE
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

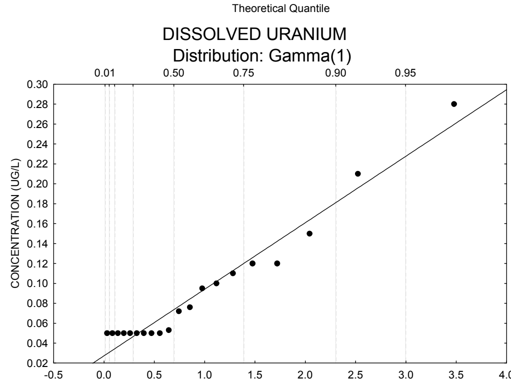

DISSOLVED SULFATE
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

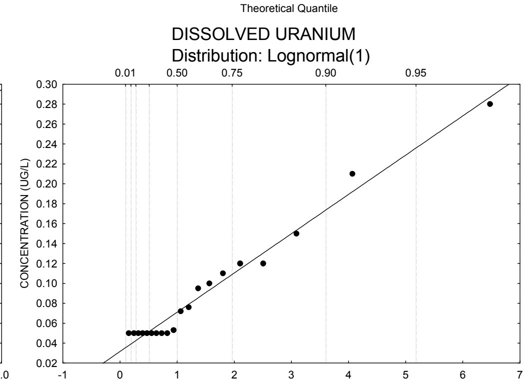

DISSOLVED THALLIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

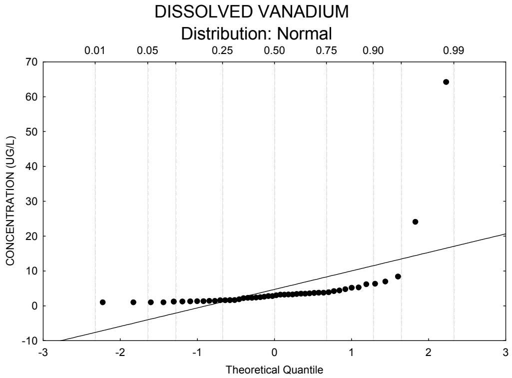

DISSOLVED THALLIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

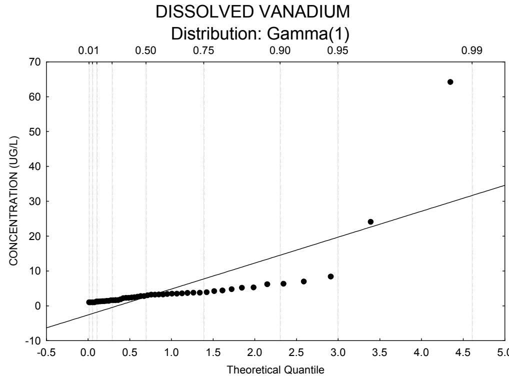

DISSOLVED THALLIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

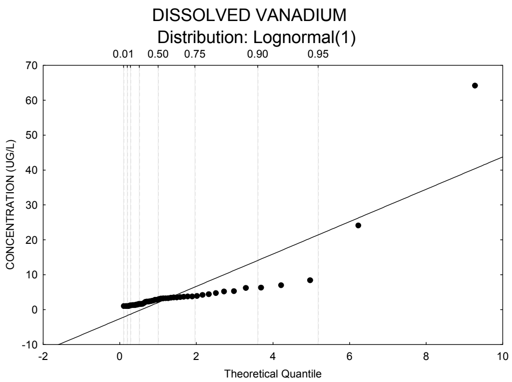

DISSOLVED URANIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

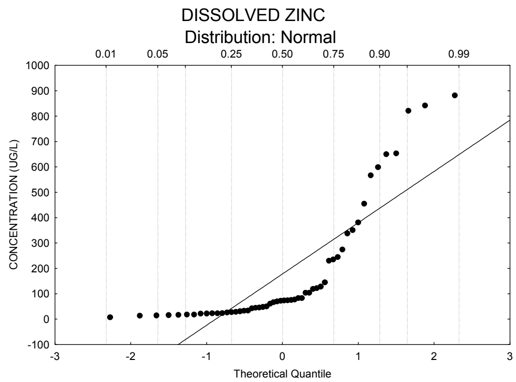

DISSOLVED URANIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

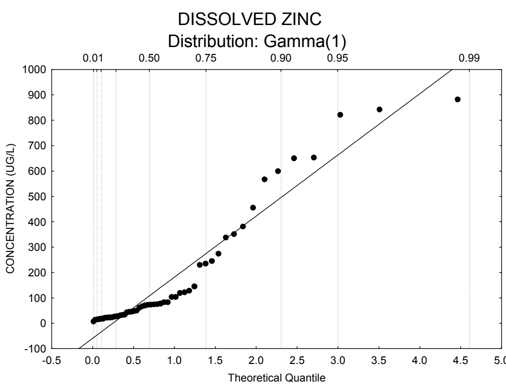

DISSOLVED URANIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

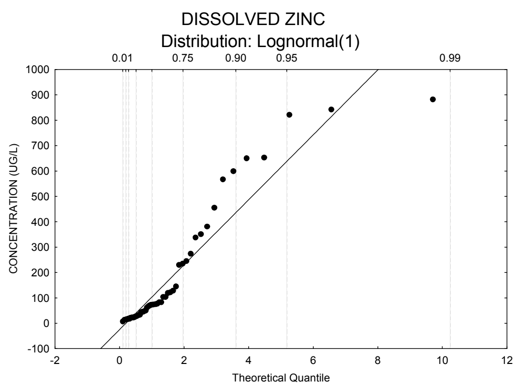

DISSOLVED VANADIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

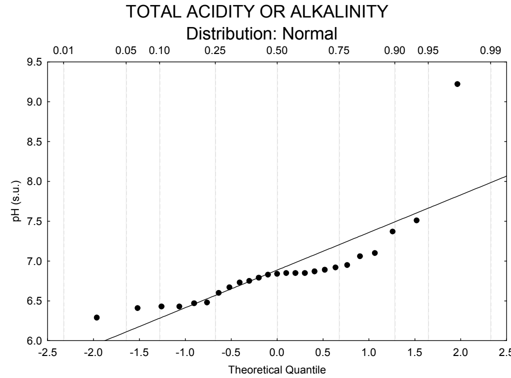

DISSOLVED VANADIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

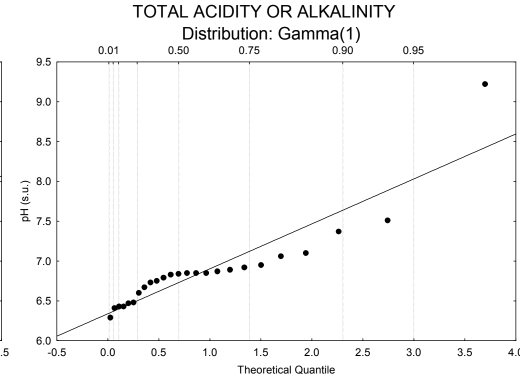

DISSOLVED VANADIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

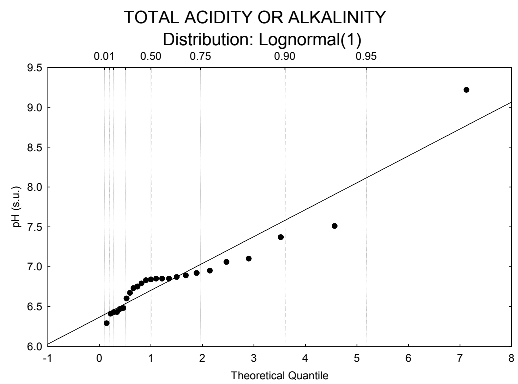

DISSOLVED ZINC
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

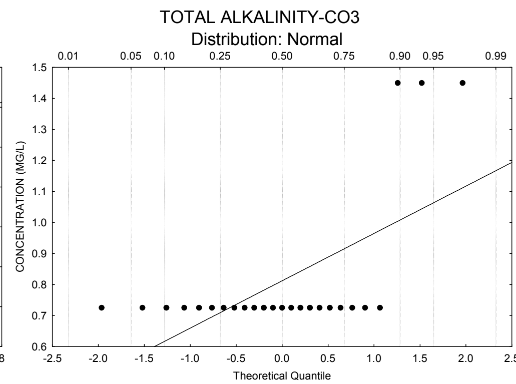

DISSOLVED ZINC
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

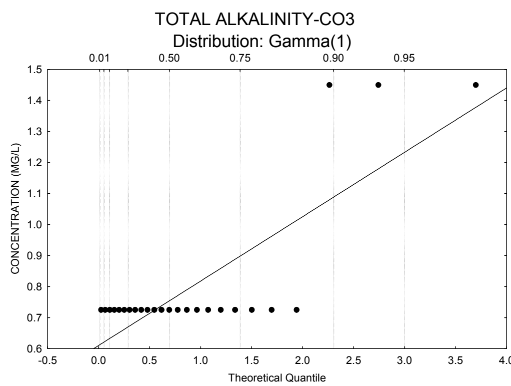

DISSOLVED ZINC
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

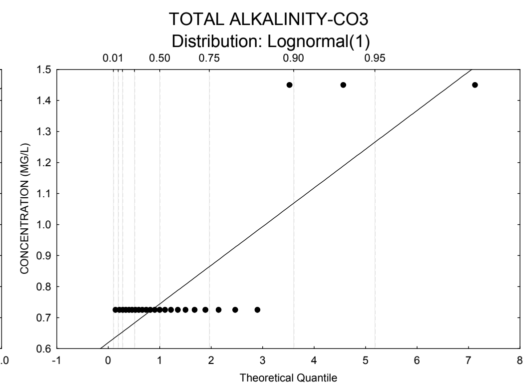

TOTAL ACIDITY OR ALKALINITY
Distribution: Normal
pH (s.u.)
Theoretical Quantile

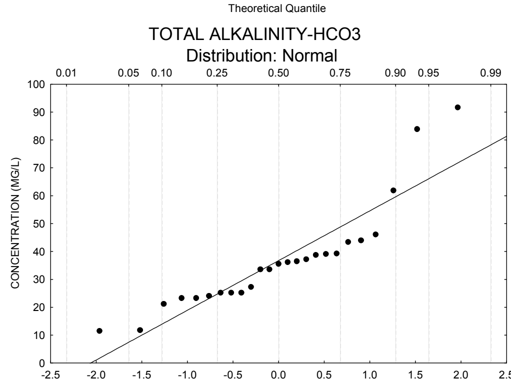

TOTAL ACIDITY OR ALKALINITY
Distribution: Gamma(1)
pH (s.u.)
Theoretical Quantile

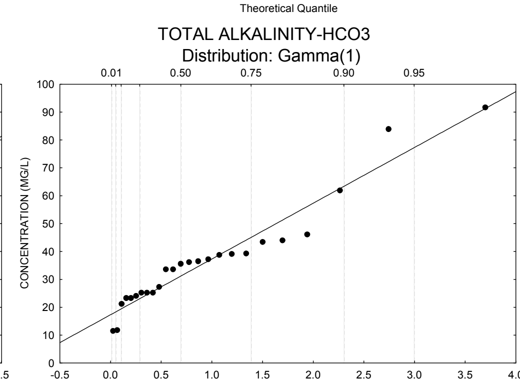

TOTAL ACIDITY OR ALKALINITY
Distribution: Lognormal(1)
pH (s.u.)
Theoretical Quantile

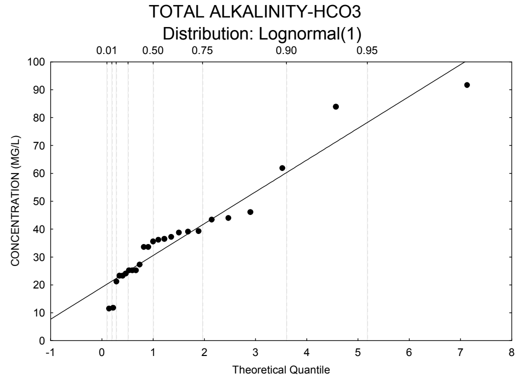

TOTAL ALKALINITY-CO3
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

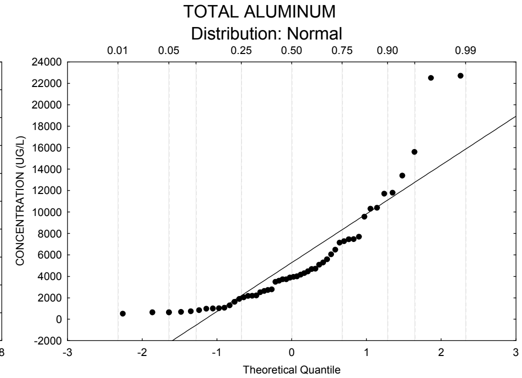

TOTAL ALKALINITY-CO3
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

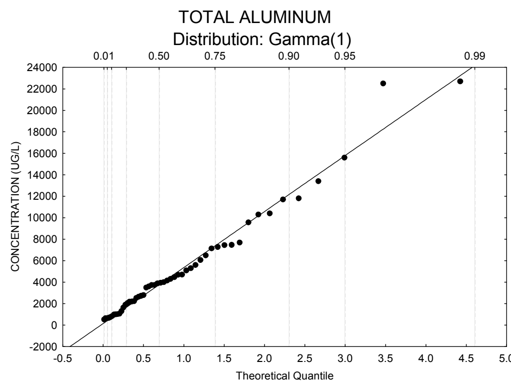

TOTAL ALKALINITY-CO3
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

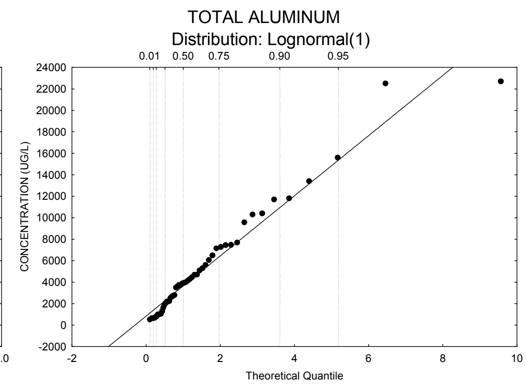

TOTAL ALKALINITY-HCO3
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

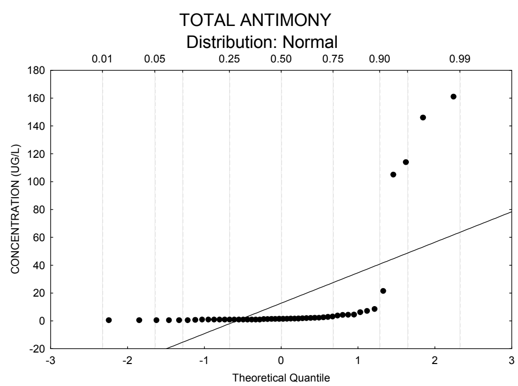

TOTAL ALKALINITY-HCO3
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

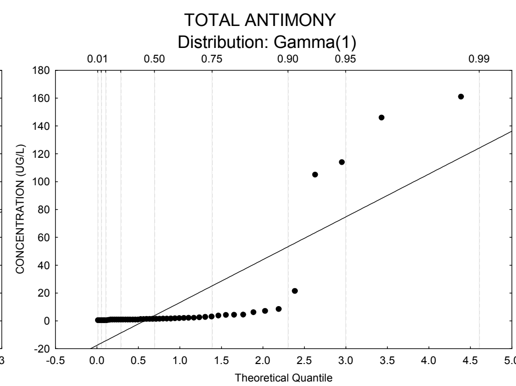

TOTAL ALKALINITY-HCO3
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

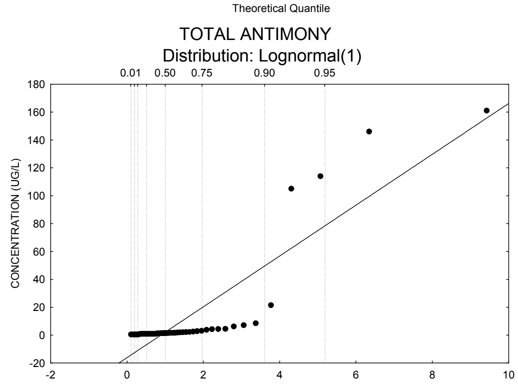

TOTAL ALUMINUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

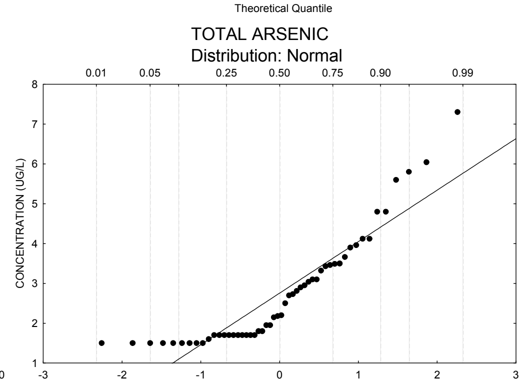

TOTAL ALUMINUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

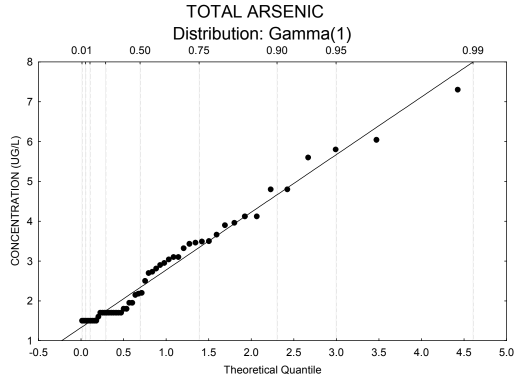

TOTAL ALUMINUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

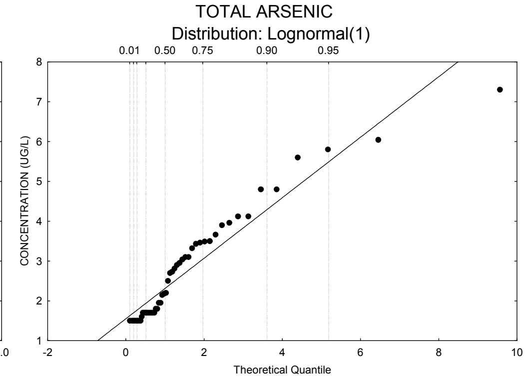

TOTAL ANTIMONY
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

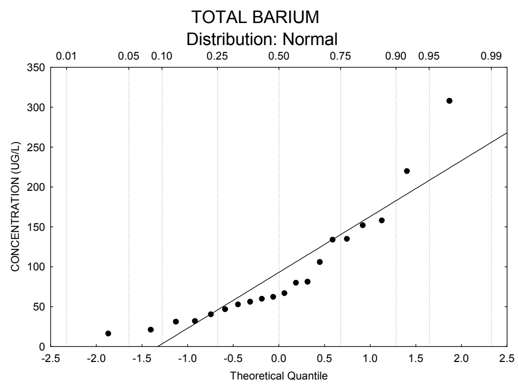

TOTAL ANTIMONY
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

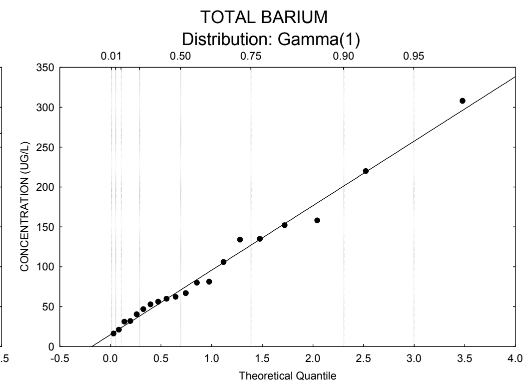

TOTAL ANTIMONY
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

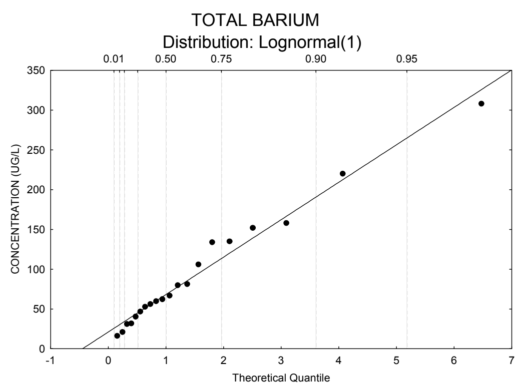

TOTAL ARSENIC
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

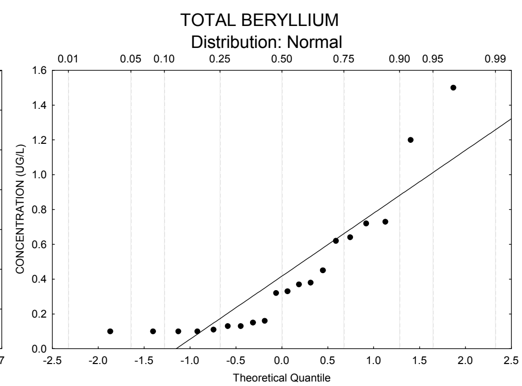

TOTAL ARSENIC
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

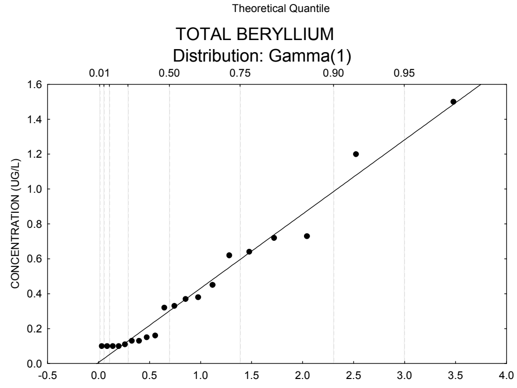

TOTAL ARSENIC
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

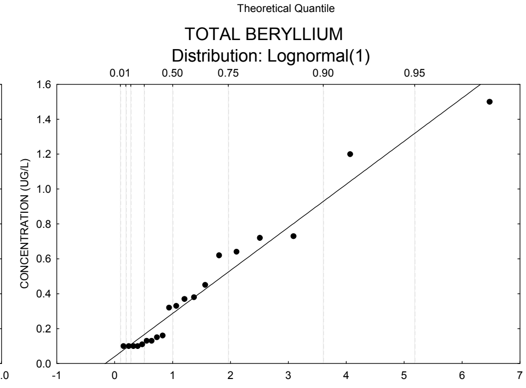

TOTAL BARIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL BARIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

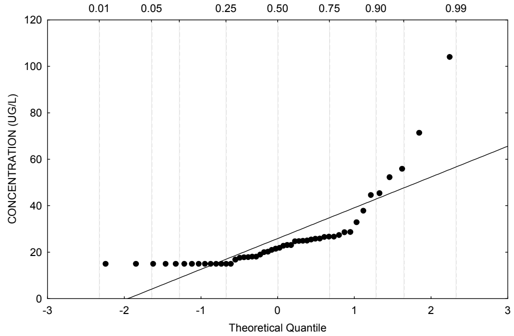

TOTAL BARIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL BERYLLIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

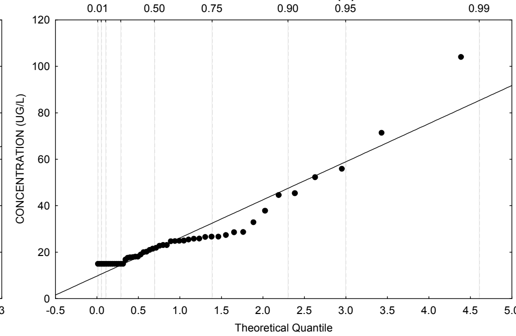

TOTAL BERYLLIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL BERYLLIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

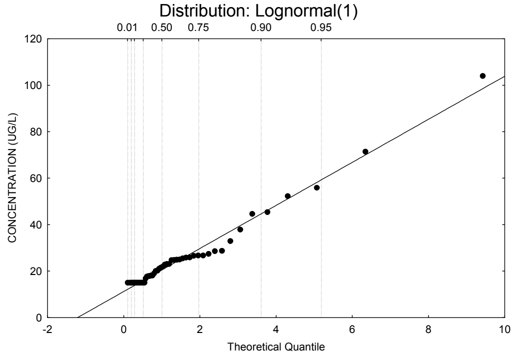
TOTAL BORON
Distribution: Normal



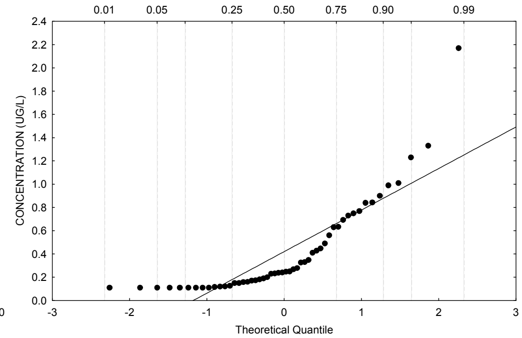
TOTAL BORON
Distribution: Gamma(1)



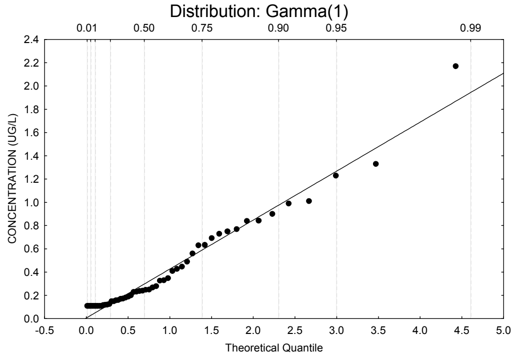
TOTAL BORON
Distribution: Lognormal(1)



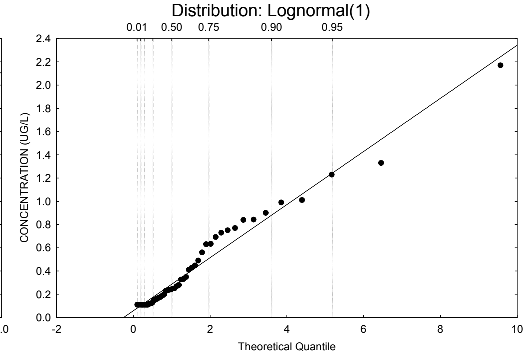
TOTAL CADMIUM
Distribution: Normal



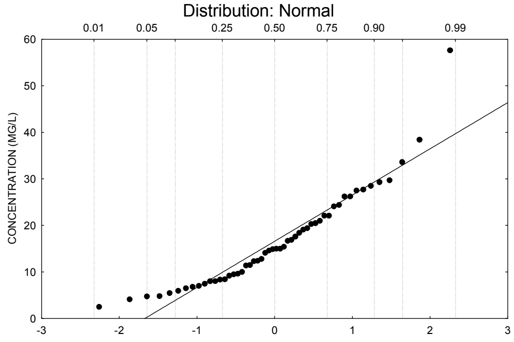
TOTAL CADMIUM
Distribution: Gamma(1)



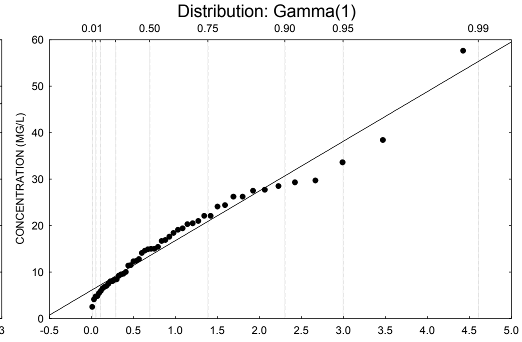
TOTAL CADMIUM
Distribution: Lognormal(1)

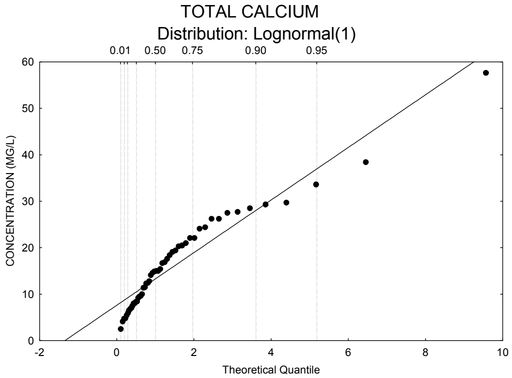


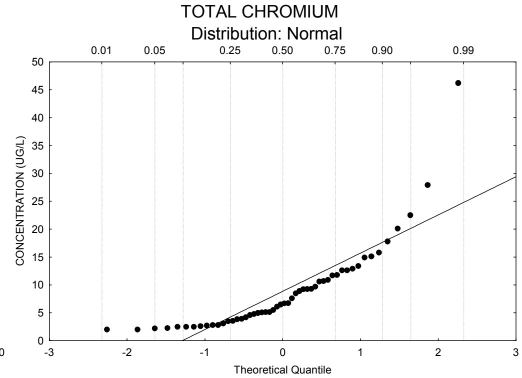
TOTAL CALCIUM
Distribution: Normal

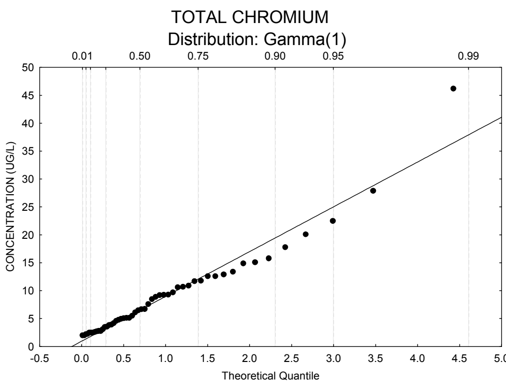


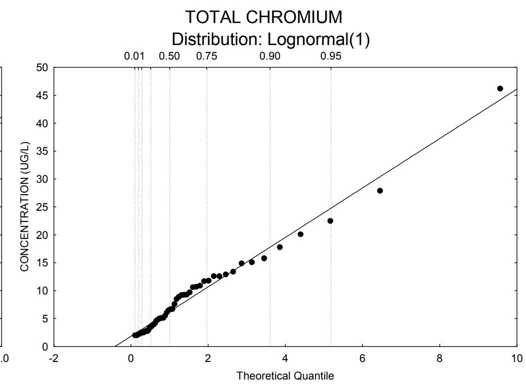
TOTAL CALCIUM
Distribution: Gamma(1)

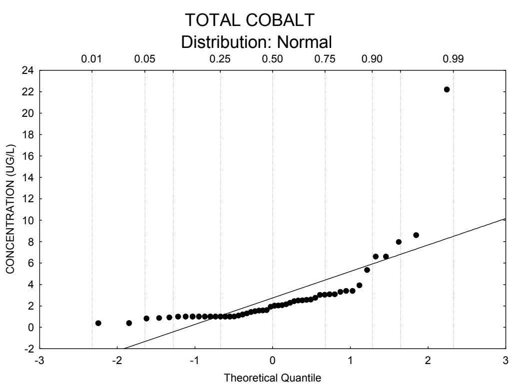


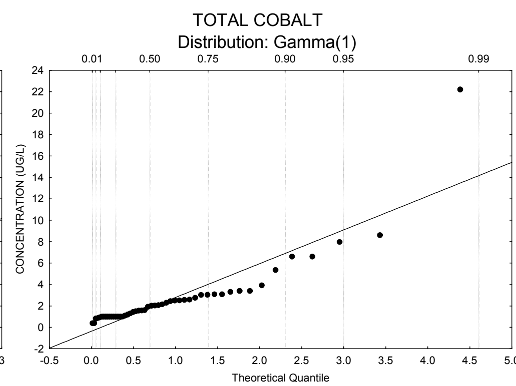

TOTAL CALCIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

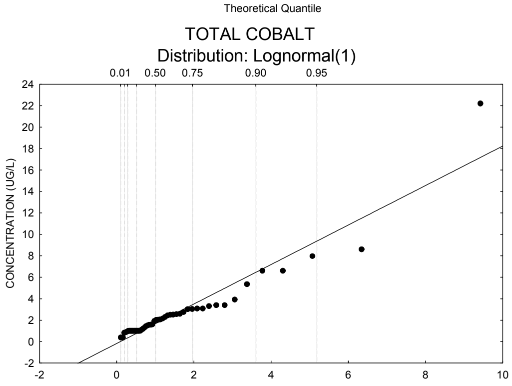

TOTAL CHROMIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

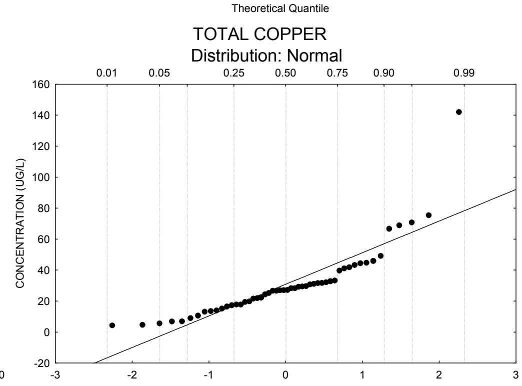

TOTAL CHROMIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL CHROMIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL COBALT
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL COBALT
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL COBALT
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile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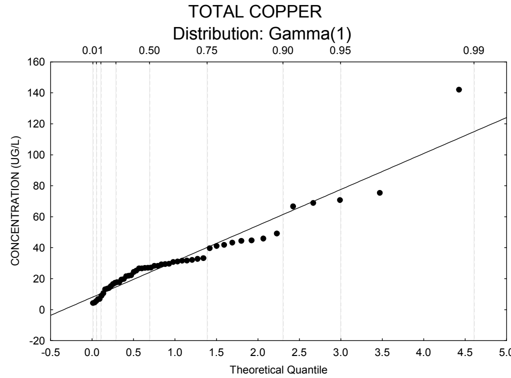
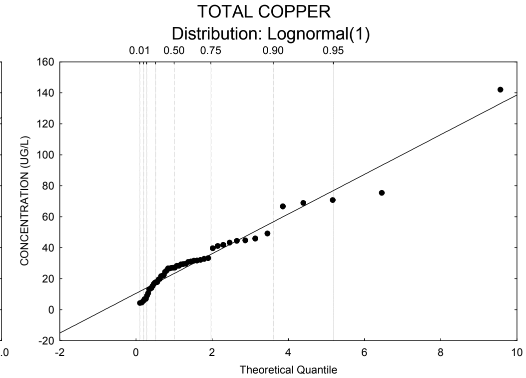
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL COPPER
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile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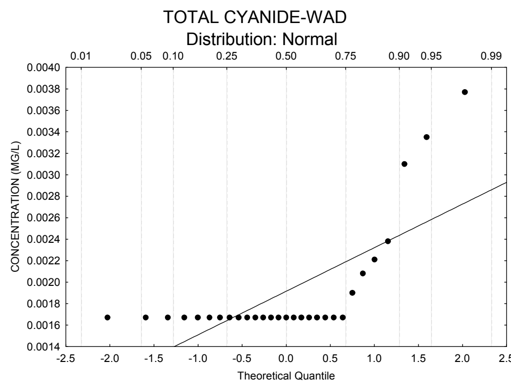
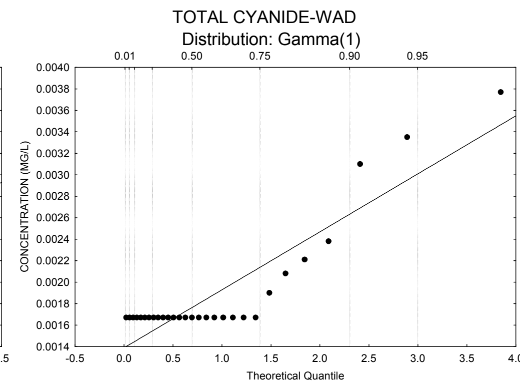
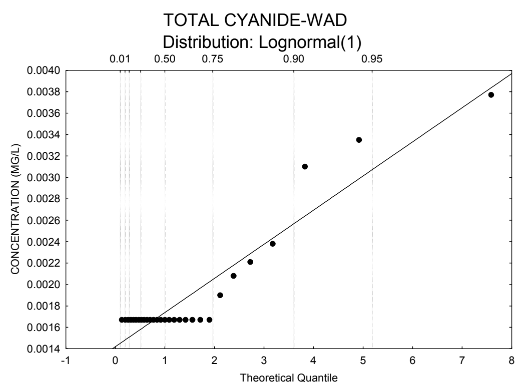
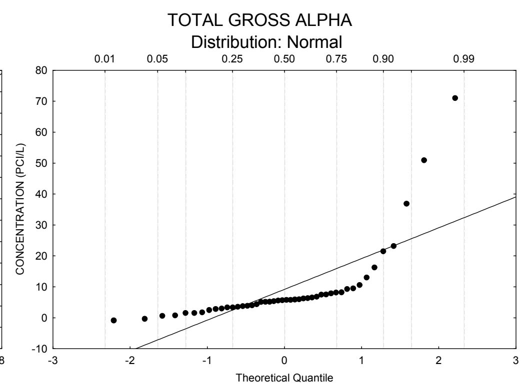
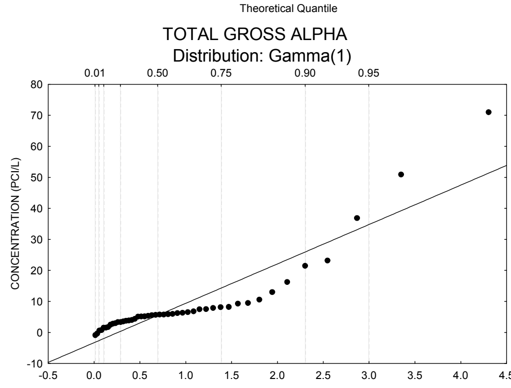
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

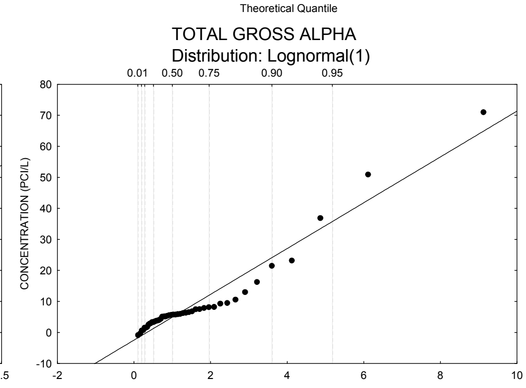

TOTAL CYANIDE-WAD
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

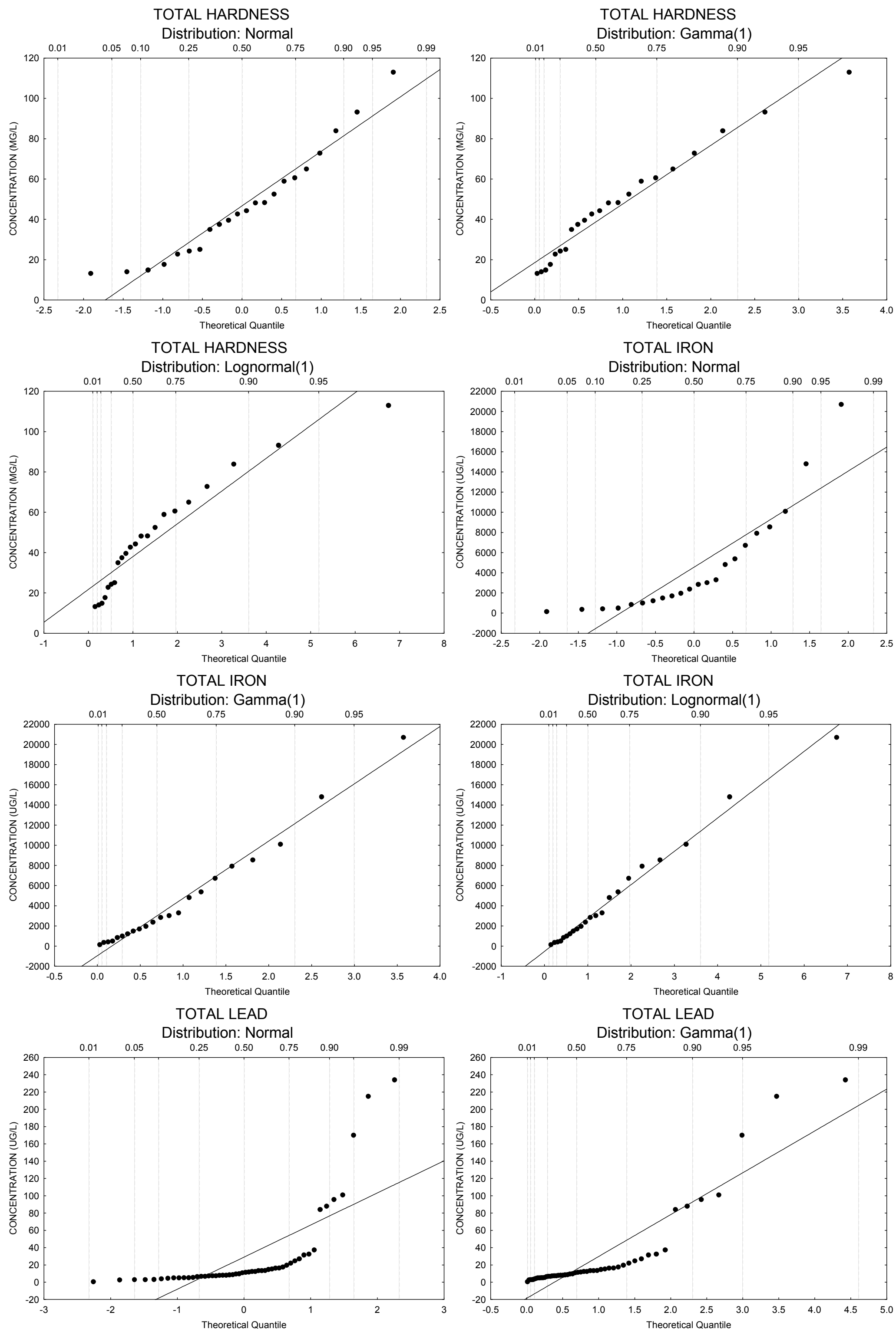

TOTAL CYANIDE-WAD
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

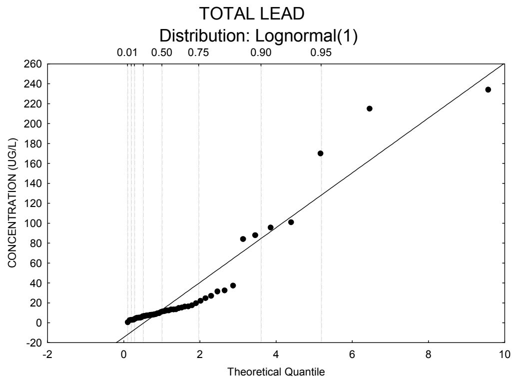

TOTAL CYANIDE-WAD
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

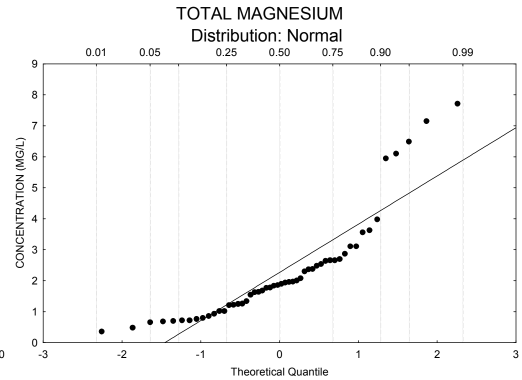

TOTAL GROSS ALPHA
Distribution: Normal
CONCENTRATION (PCI/L)
Theoretical Quantile

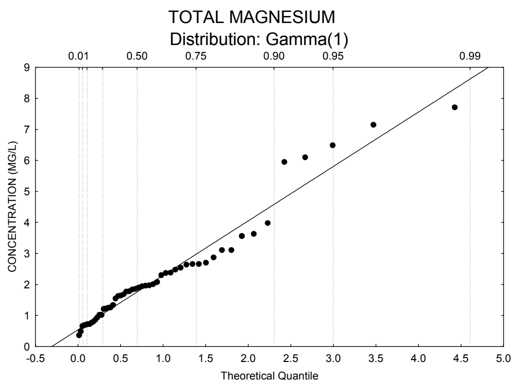

TOTAL GROSS ALPHA
Distribution: Gamma(1)
CONCENTRATION (PCI/L)
Theoretical Quantile

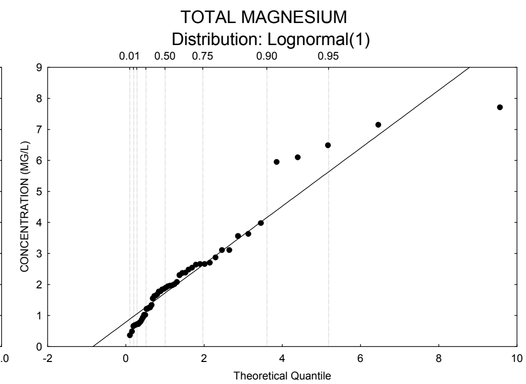

TOTAL GROSS ALPHA
Distribution: Lognormal(1)
CONCENTRATION (PCI/L)
Theoretical Quantile

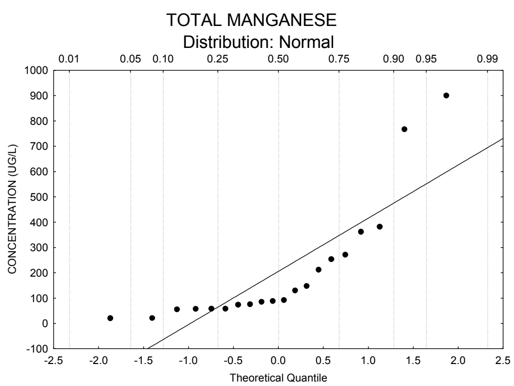

TOTAL HARDNESS
Distribution: Normal
TOTAL HARDNESS
Distribution: Gamma(1)
TOTAL HARDNESS
Distribution: Lognormal(1)
TOTAL IRON
Distribution: Normal
TOTAL IRON
Distribution: Gamma(1)
TOTAL IRON
Distribution: Lognormal(1)
TOTAL LEAD
Distribution: Normal
TOTAL LEAD
Distribution: Gamma(1)
CONCENTRATION (MG/L)
CONCENTRATION (UG/L)
Theoretical Quantile

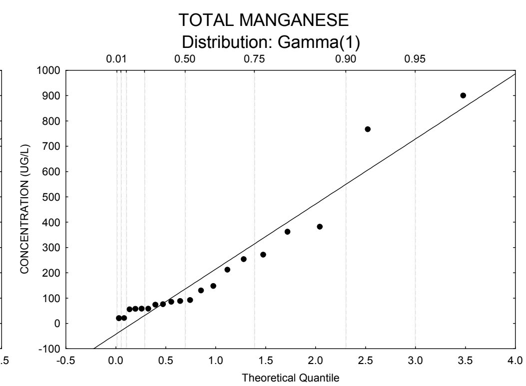

TOTAL LEAD
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

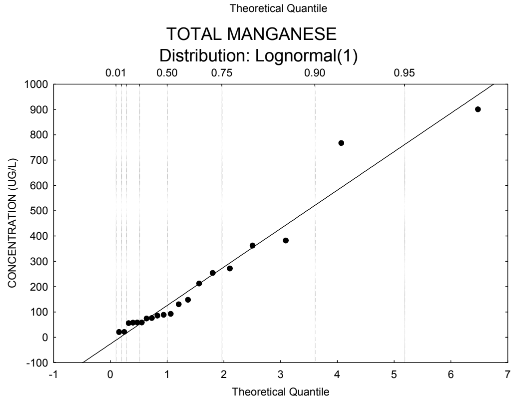

TOTAL MAGNESIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

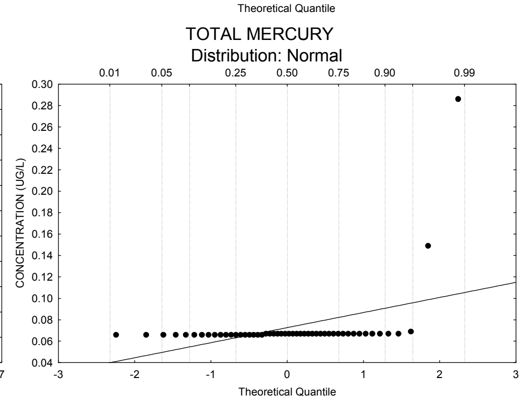

TOTAL MAGNESIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile

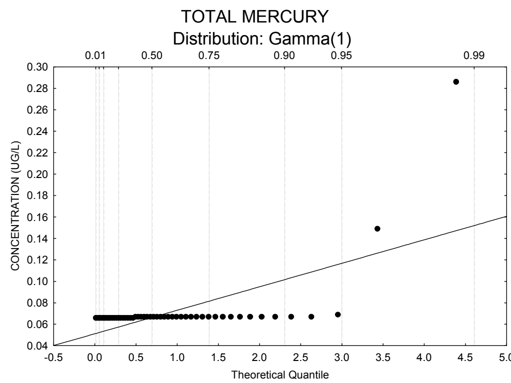

TOTAL MAGNESIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

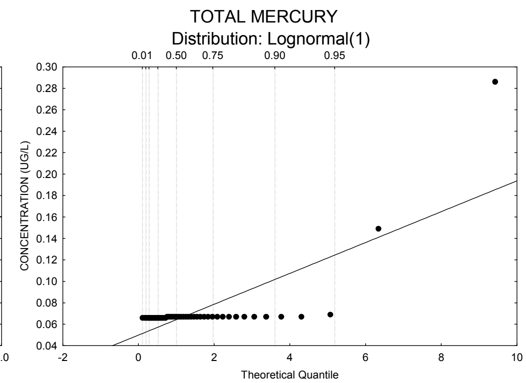

TOTAL MANGANESE
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

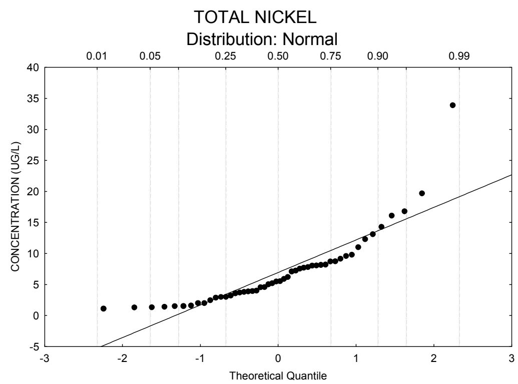

TOTAL MANGANESE
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

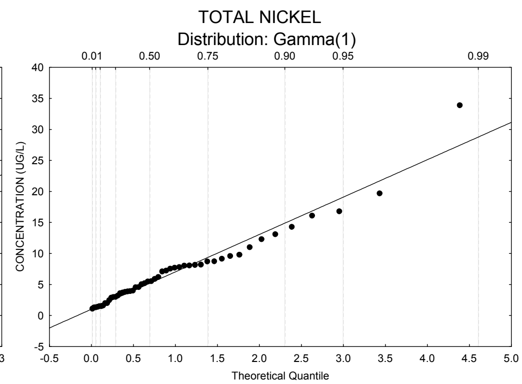

TOTAL MANGANESE
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

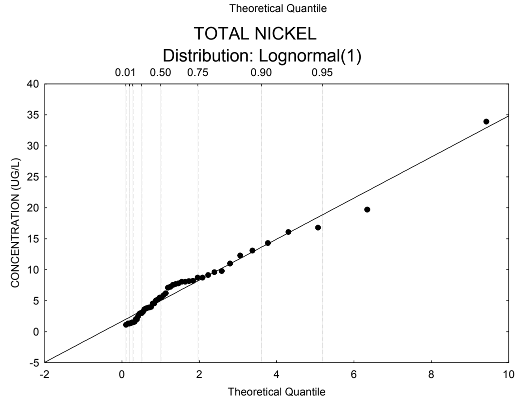

TOTAL MERCURY
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

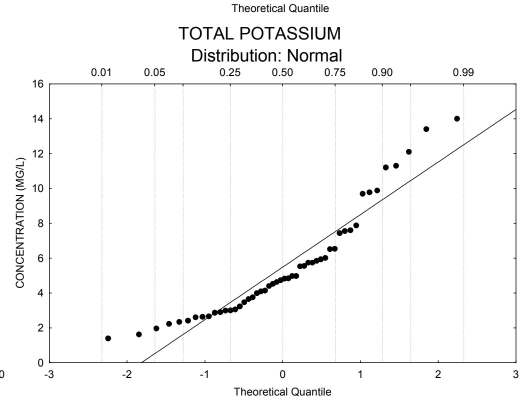

TOTAL MERCURY
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

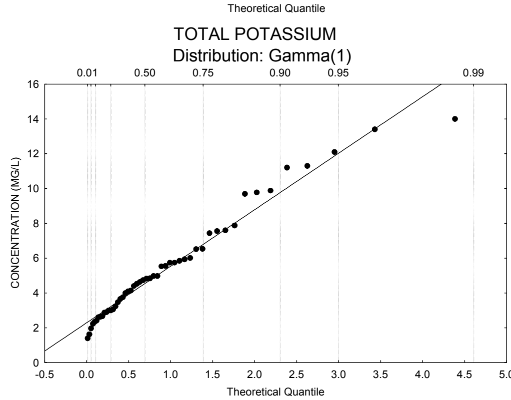

TOTAL MERCURY
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

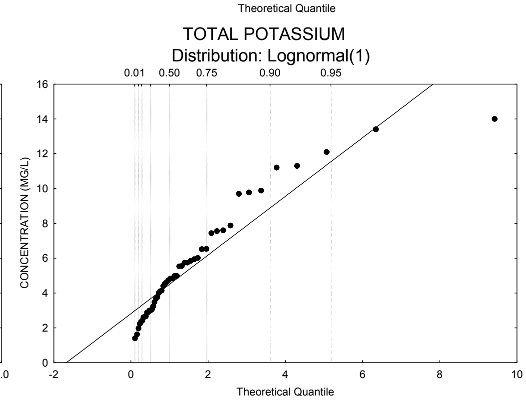

TOTAL NICKEL
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL NICKEL
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

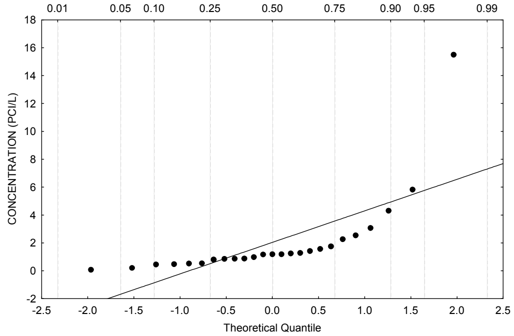

TOTAL NICKEL
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL POTASSIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

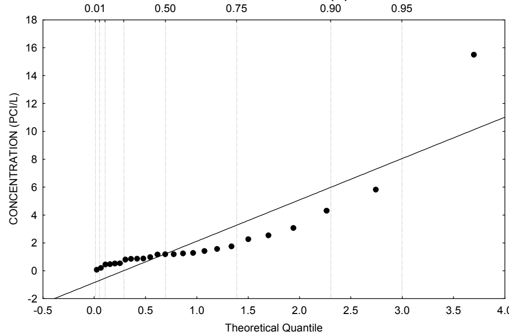

TOTAL POTASSIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile


TOTAL POTASSIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

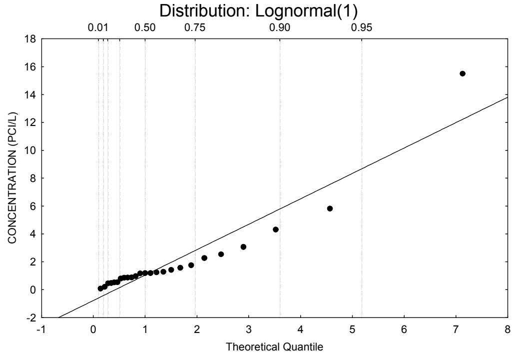
TOTAL RADIUM-226 AND 228
Distribution: Normal



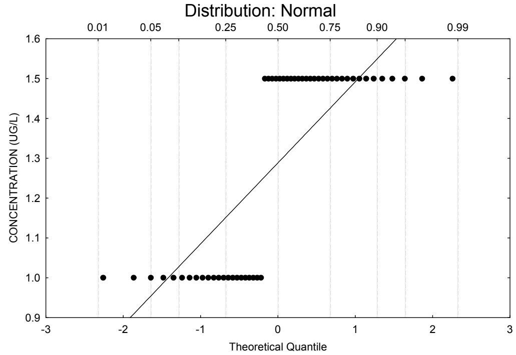
TOTAL RADIUM-226 AND 228
Distribution: Gamma(1)



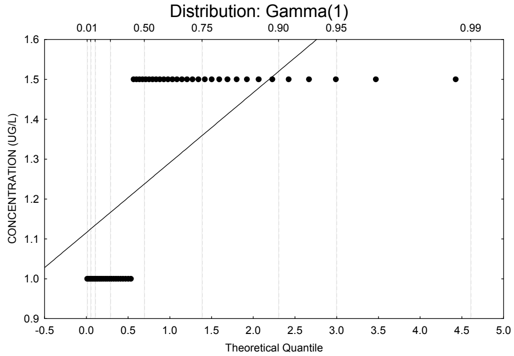
TOTAL RADIUM-226 AND 228
Distribution: Lognormal(1)



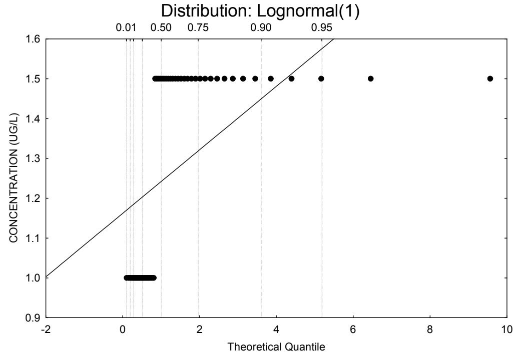
TOTAL SELENIUM
Distribution: Normal



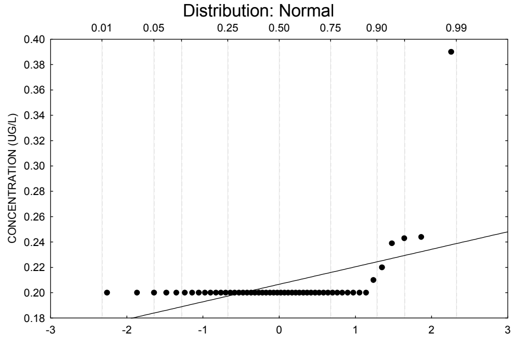
TOTAL SELENIUM
Distribution: Gamma(1)



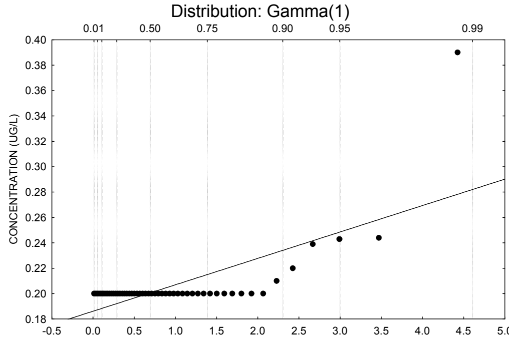
TOTAL SELENIUM
Distribution: Lognormal(1)

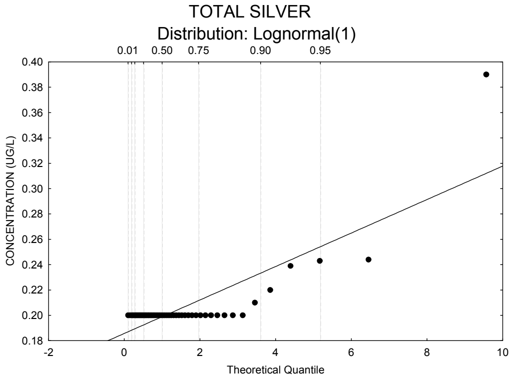


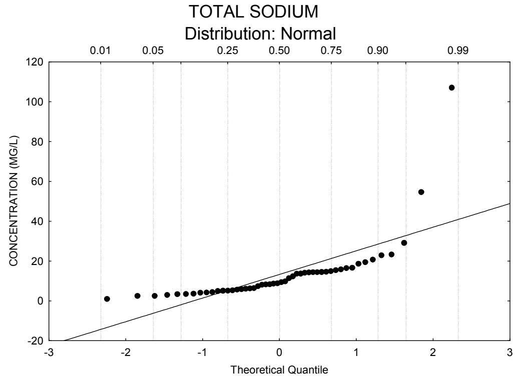
TOTAL SILVER
Distribution: Normal

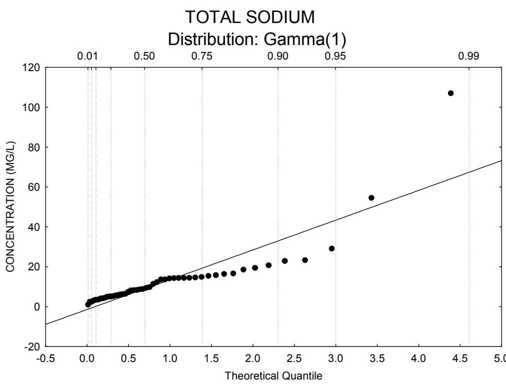


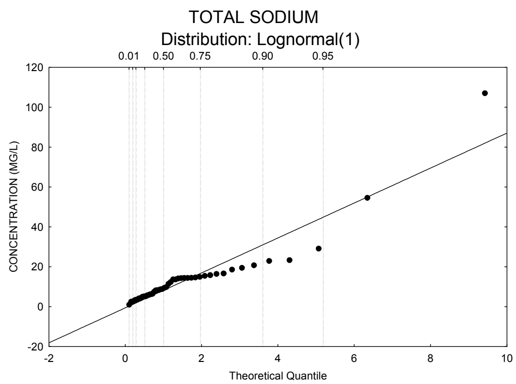
TOTAL SILVER
Distribution: Gamma(1)

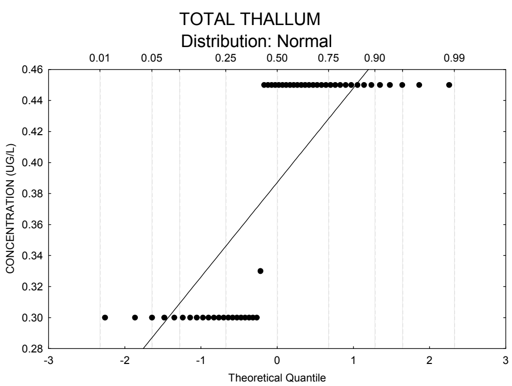


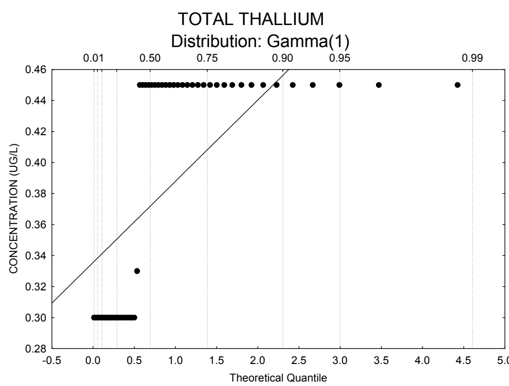

TOTAL SILVER
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile

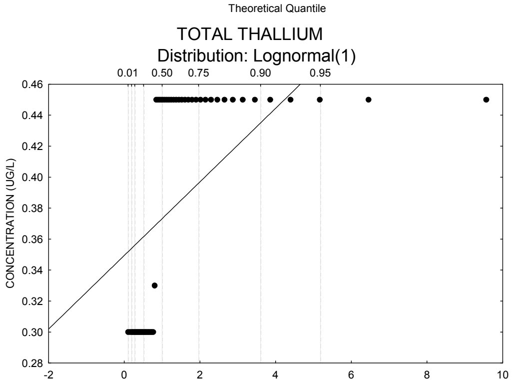

TOTAL SODIUM
Distribution: Normal
CONCENTRATION (MG/L)
Theoretical Quantile

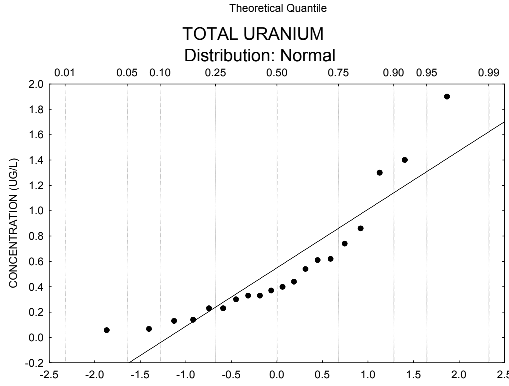

TOTAL SODIUM
Distribution: Gamma(1)
CONCENTRATION (MG/L)
Theoretical Quantile


TOTAL SODIUM
Distribution: Lognormal(1)
CONCENTRATION (MG/L)
Theoretical Quantile

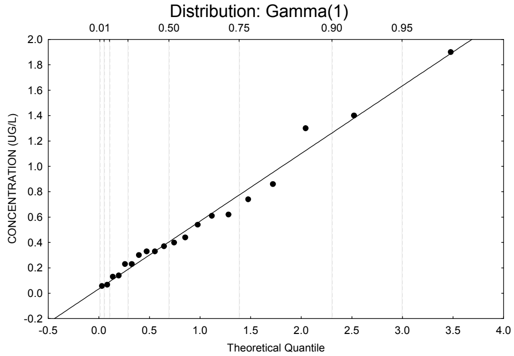

TOTAL THALLUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL THALLIUM
Distribution: Gamma(1)
CONCENTRATION (UG/L)
Theoretical Quantile

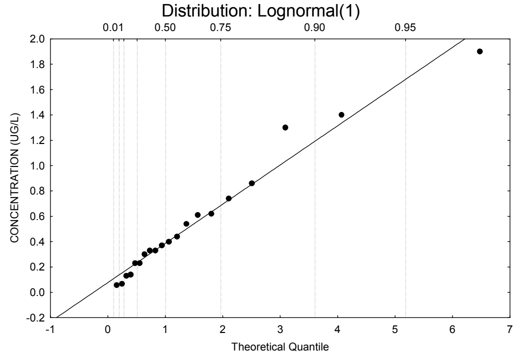

TOTAL THALLIUM
Distribution: Lognormal(1)
CONCENTRATION (UG/L)
Theoretical Quantile


TOTAL URANIUM
Distribution: Normal
CONCENTRATION (UG/L)
Theoretical Quantile

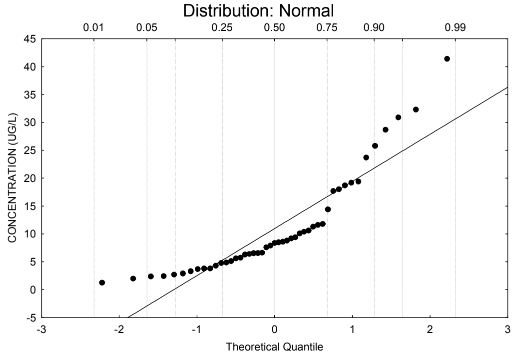
TOTAL URANIUM
Distribution: Gamma(1)



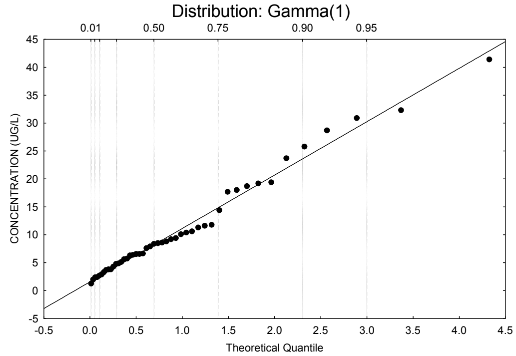
TOTAL URANIUM
Distribution: Lognormal(1)



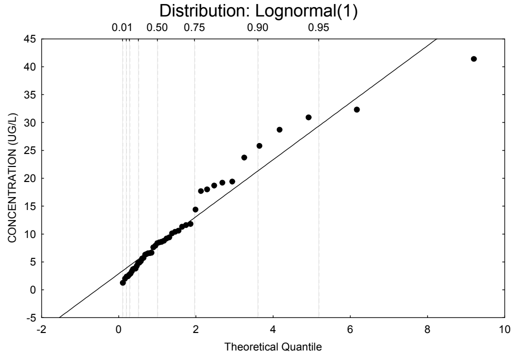
TOTAL VANADIUM
Distribution: Normal



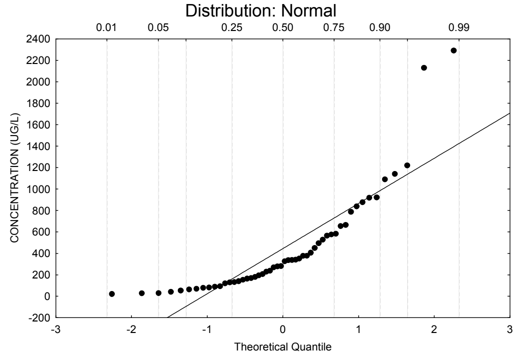
TOTAL VANADIUM
Distribution: Gamma(1)



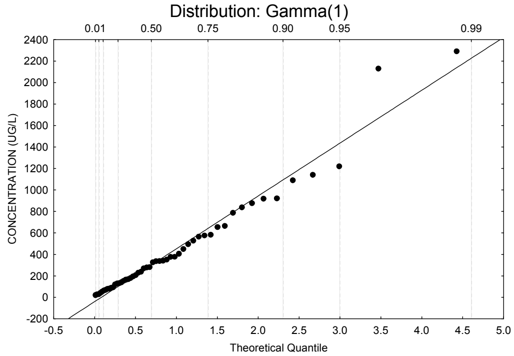
TOTAL VANADIUM
Distribution: Lognormal(1)



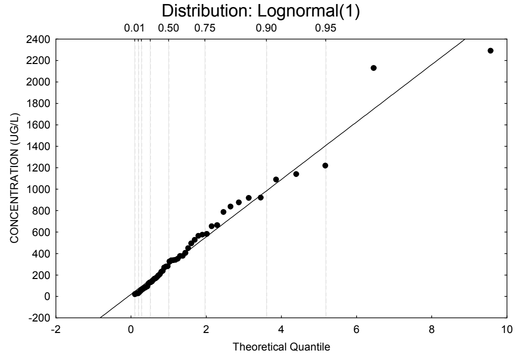
TOTAL ZINC
Distribution: Normal



TOTAL ZINC
Distribution: Gamma(1)



TOTAL ZINC
Distribution: Lognormal(1)



Appendix B

Results Used to Calculate Statistical Parameters
(on CD included with this document)